CHAPTER 76

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE

NONE

CHAPTER 76

ENGINE CONTROLS

LIST OF EFFECTIVE PAGES

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		2	Jun 15/96	
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		2	Nov 15/86	
		3/4	Feb 15/82	
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	76-00-00	1/2	Nov 15/86	
	76-00-00	3/4	May 15/77	
	76-11-00	1	Dec 15/94	
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R	76-11-00	4	Jun 15/96	
R	76-11-00	5/6	Jun 15/96	
R	76-11-00	7	Jun 15/96	
R	76-11-00	8	Jun 15/96	
R	76-11-00	9	Jun 15/96	
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76-11-02	622	Jun 15/79	
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76-11-08	401	Mar 15/80	
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76-20-00	503	Aug 15/81	
76-20-00	504	May 15/88	
76-20-00	505	Aug 15/81	
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CHAPTER 76

ENGINE CONTROLS

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FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
R 76 11 01 __	1. (01=ENG 1, 02=ENG 2, 03=ENG 3) engine power control lever(s) binding. (Ref. Chapter 71 for Fault Code diagram.)
	2. 76-11-00 Fig. 103 Block 1

CHAPTER 76

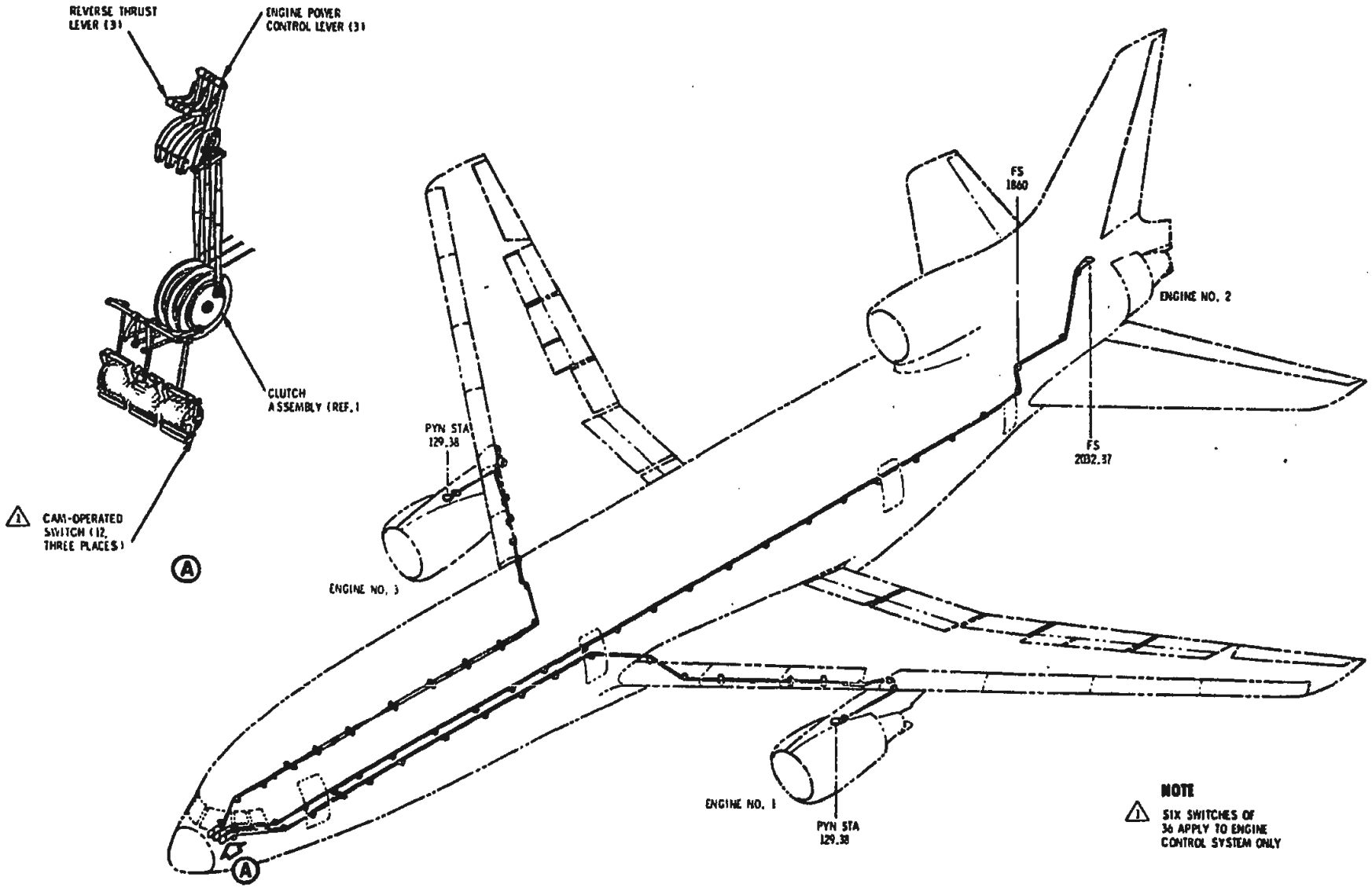
ENGINE CONTROLS - DESCRIPTION AND OPERATION

1. General

The engine control system connects the engine power control levers in the flight station, zone 210, to the engine fuel system, zones 412, 422, and 432, to provide a mechanical manual control of engine forward and reverse thrust (Ref. Fig. 1). The system is a direct-drive rod, cable and pulley type of linkage up to the point of engine interface (Ref. 76-11-00). Automatic control of the engine power control system is provided for the autopilot system by the auto throttle system (Ref. 22-31-00).

R Controlling of an engine in forward thrust is performed by moving the engine power control lever, zone 210, forward and backward. Movement of theengine power control lever is translated to the engine interface through the pulley and cable system. The cable drive starts at the auto throttle clutch assembly and ends at the throttle cable tension regulator, zones 452, 462, and 471. The output of the cable tension regulator is translated to the torque shaft, the motion compensator, and to the engine mounted input control box, zones 412, 422, and 432 (Ref. 76-11-00). Moving the power control lever through 56 degrees of travel between idle and maximum forward power positions the engine fuel control unit input pulley between 42.5 and 90 degrees for forward thrust.

R Controlling the engine in reverse thrust is performed by moving the reverse thrust lever, zone 210, mounted on theengine power control lever. Movement of the reverse thrust lever is translated through the same control system as that used by the engine power control lever. Moving of the reverse thrust lever through a 150-degree arc positions the input control box (Ref. 76-11-00) between 42.5 and 1 degrees engine power setting for reverse thrust.



Engine Control System General Arrangement
Figure 1

EFFECTIVITY: ALL

001B

ENGINE CONTROL SYSTEM - DESCRIPTION AND OPERATION

1. General

The engine power control system provides the flight crew with a direct means of controlling the power output of the engines for either forward or reverse thrust. The system is of the direct-drive rod, cable, and pulley type. A set of controls is provided for each of the three power plants (Ref. Fig. 1).

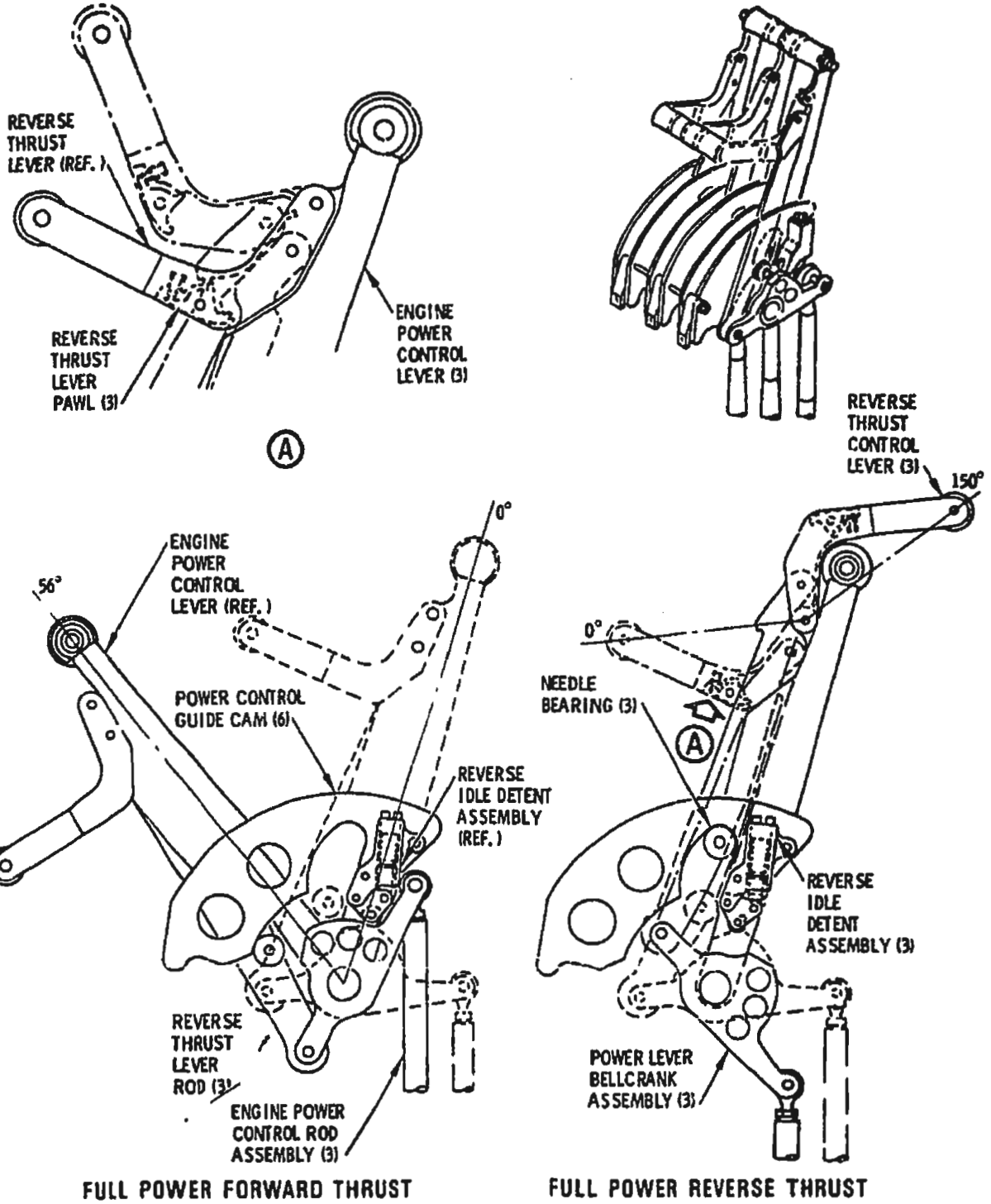
Each set of control (Ref. Fig. 2) consists of an engine power control lever, a reverse thrust lever, an auto throttle clutch assembly, cam-operated switches (zone 210), a throttle cable tension regulator, an engine motion compensator assembly and a torque shaft assembly. The pylon or fuselage-mounted controls interface with the engine-mounted input control box through the pantograph-type connection of the engine motion compensator assembly. This type of linkage accomodates motion between the engine and the airframe without affecting the engine power setting or transmitting motion inputs back to the power lever. The engine-mounted controls, zones 412, 422, and 432, complete the power control system.

2. Operation

Full movement of the engine power control lever between idle and maximum forward power (approximately 56 degrees) results in approximately 48 degrees of engine fuel control unit travel. Movement of the engine power control lever from the idle position to the maximum-power position is translated through the clutch assembly control cables, throttle cable tension regulator, and the engine motion compensator assembly, zones 452, 462, and 471, to operate the engine controls and thus increase power.

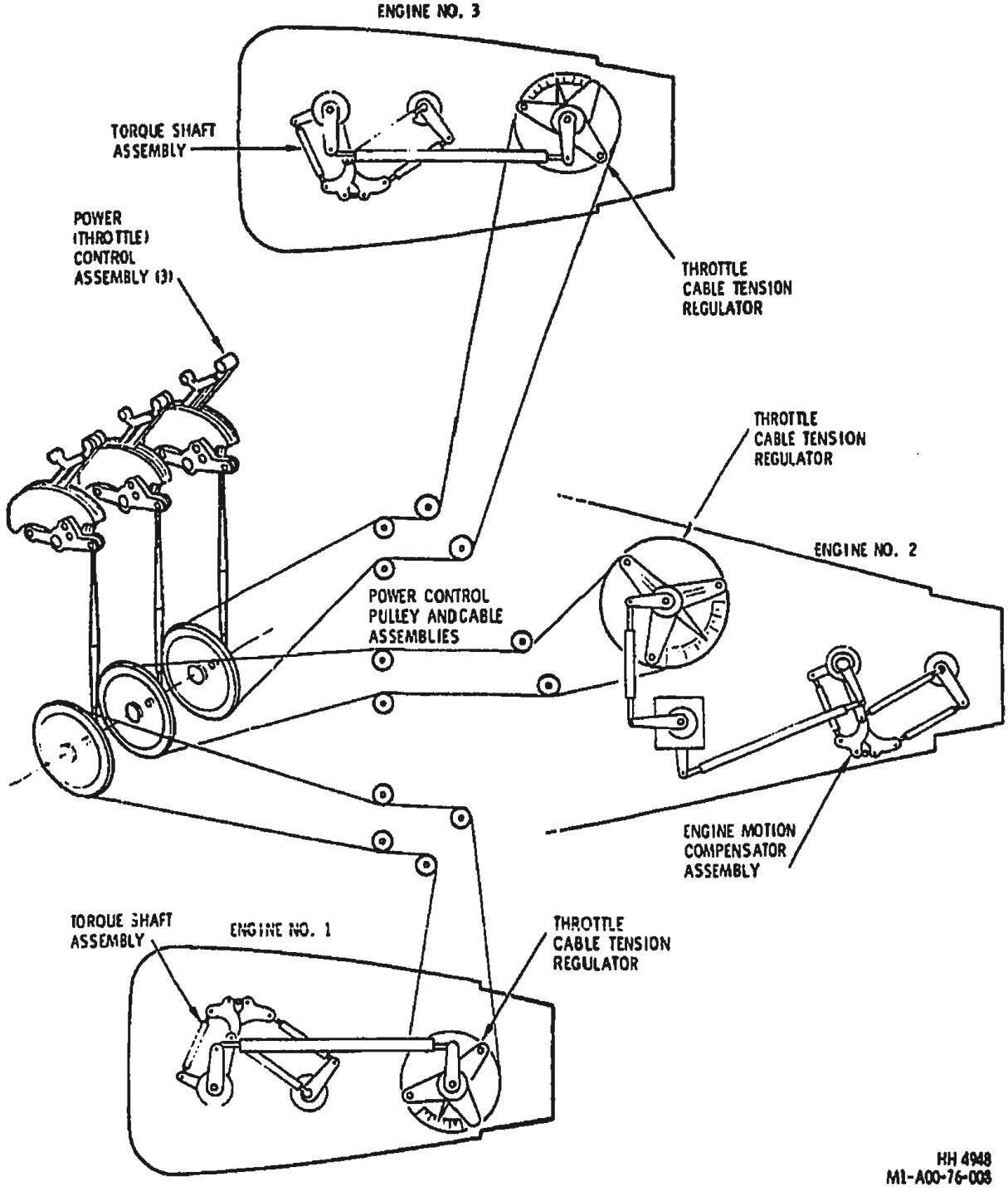
R During ground operation of the engine control system, the ground idle solenoids (one for each engine) are energized to provide a reduction in engine power between 36 and 63 degrees of engine power setting at the fuel control unit (Ref. Fig. 3). Each ground idle solenoid is energized by its associated ground idle switch (located below the clutch assembly in the control pedestal) and by its ground idle relay.

R When either the ground idle switch or ground idle relay opens the ground idle solenoid deenergizes and power increases. Advancing the engine power setting above 63 degrees opens the ground idle switch by cam action. As the aircraft leaves the ground and the weight is removed from the landing gear, the ground idle relay opens.

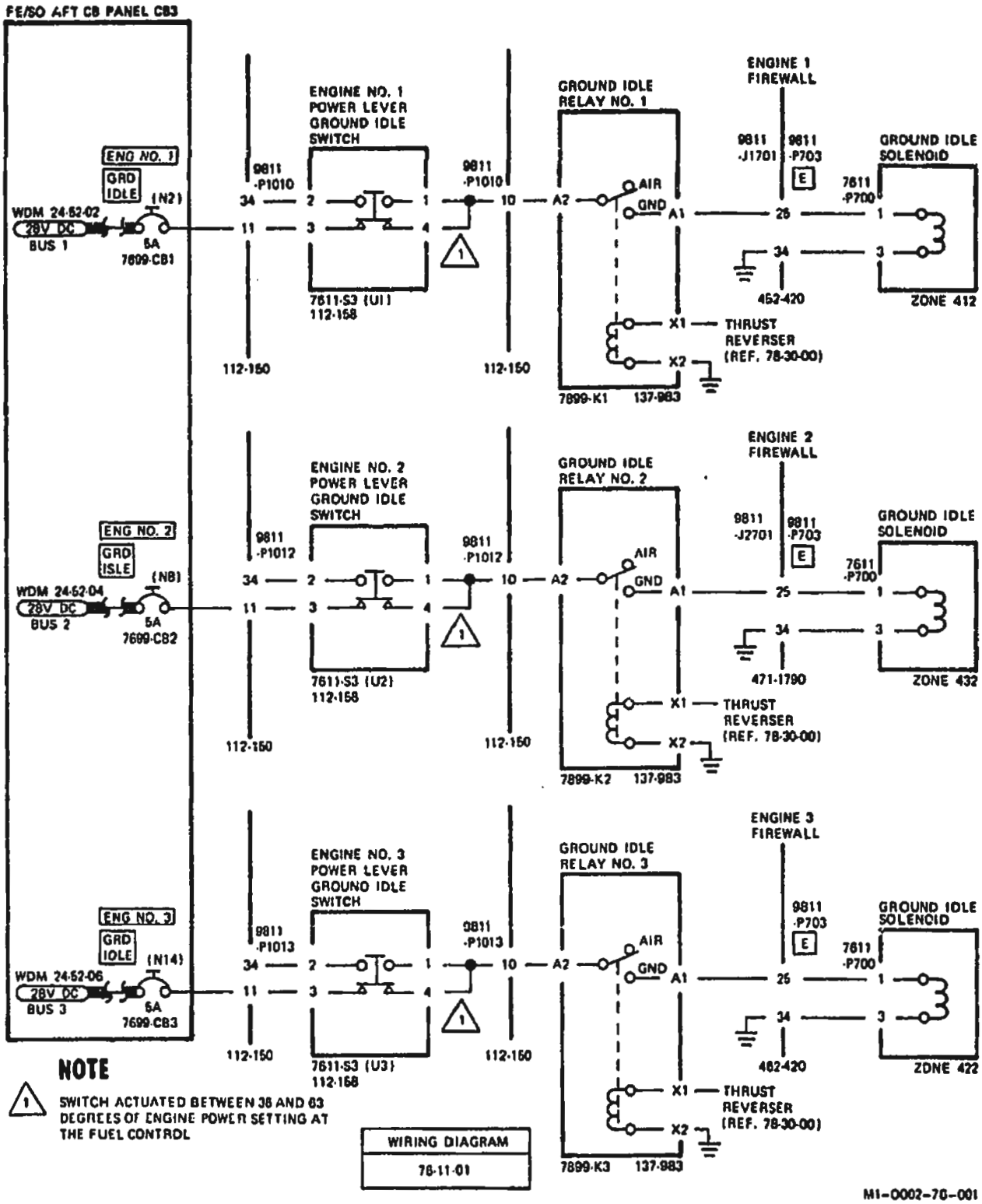


HH 6045
M1-A01-76-004

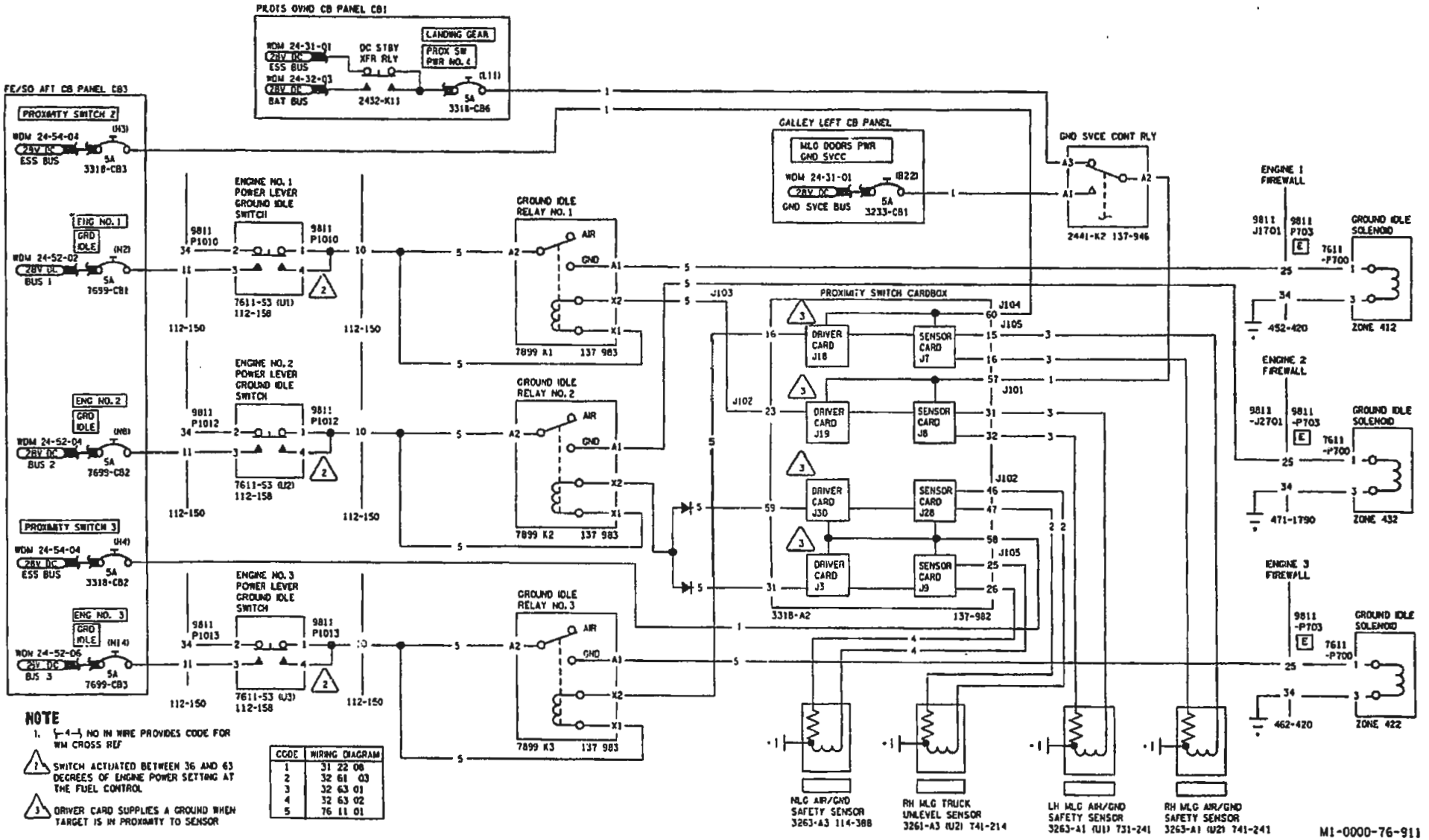
Power Control Levers Installation
Figure 1



Control System Mechanical Schematic
Figure 2



Ground Idle Schematic
Figure 3



NOTE

1. ⊢4⊣ NO IN WIRE PROVIDES CODE FOR WM CROSS REF
2. SWITCH ACTUATED BETWEEN 36 AND 63 DEGREES OF ENGINE POWER SETTING AT THE FUEL CONTROL
3. DRIVER CARD SUPPLIES A GROUND WHEN TARGET IS IN PROXIMITY TO SENSOR

CODE	WIRING DIAGRAM
1	31 22 08
2	32 61 03
3	32 63 01
4	32 63 02
5	76 11 01

R R Ground Idle Schematic
Figure 3

R EFFECTIVITY: WITH SB76-018

0018

Forward movement of the engine power control lever during flight through the 0- to 56- degree travel (42.5- to 91-degree engine power setting at the fuel control unit) provides the full range of forward thrust between flight idle power and maximum forward power.

Reverse thrust can only be selected while the aircraft is on the ground and when the engine power control lever is in the idle position. Two cam guides hold the engine power control lever in place throughout the reverse thrust operation. Lifting the reverse thrust lever through 150 degrees moves the engine fuel control unit input from approximately 42.5 to 1 degrees and selects reverse thrust. This action is translated through the same control system as that used by the engine power control lever.

Initial aft movement of the reverse thrust lever does the following:

Releases a spring-loaded pawl that is built into the reverse thrust lever

Operates the engine reverse thrust switch which is in series with the proximity switch logic box

Energizes, on the ground only, the pressure regulating and shutoff valve solenoid and the reverse thrust selector valve solenoid

Positions the mechanical reverse thrust selector valve for movement of the translating cowl and hot stream spoiler doors (Ref. 78-31-00)

Further reverse thrust lever movement is prevented by the forward baulk block on the mixing mechanism assembly until the mechanical baulk is removed. As the thrust reverser translating cowl moves rearward, a feedback mechanism relays the cowl movement to a lever that is in contact with the forward baulk block. This cowl movement progressively swings the lever from the forward baulk block to a position just forward of the rear block. With the mechanical baulk removed, the reverse thrust lever is free to be moved further aft to the maximum reverse thrust position.

Forward movement of the reverse thrust lever from maximum reverse to reverse idle causes the the power lever bellcrank to contact a detent. When the bellcrank contacts the detent, the lever operating load increases, which enables the pilot to stop the levers within the reverse idle range with the reverser mechanism deployed.

3. Engine Power Control Units

A. Description and Operation

Engine power control units mounted on the control pedestal in the flight station, consist of engine power control levers, reverse thrust levers, clutch assembly pulleys, power lever bellcrank assemblies, power control guide cams, and reverse idle detent assemblies (Ref. Fig. 1).

Forward thrust for each engine is controlled by a conventional engine power control lever. Each lever requires a force of approximately 3.0 pounds to operate between the fuel control unit setting of 42.5 degrees (forward idle setting) and 91 degrees (maximum forward thrust position). Reverse thrust is controlled by a reverse thrust lever which is mounted on the engine power control lever. The reverse thrust lever operates through an arc of 150 degrees to obtain a full reverse fuel control unit movement of 42.5 to 1 degrees. Full 1- to 90-degree movement of the fuel control unit is translated at a one-to-one ratio from the engine mounted input control box. Movement of the reverse thrust lever is positively restricted while the engine power control lever is in any forward thrust position. Two guide cams and a needle bearing allow the reverse thrust lever to be actuated only when the engine power control lever is in its idle position.

On-center linkage prevents inadvertent movement of the controls to reverse thrust with a spring-loaded pawl holding the reverse thrust linkage on center. The pawl applies a restraining moment to the initial effort of moving the reverse thrust lever toward reverse. This restraining moment prevents the lever from being moved to reverse by vibration of the aircraft or by other forces exerted within the control system.

An adjustable reverse idle detent assembly is incorporated in the engine power control lever assembly (Ref. Fig. 1). The reverse idle detent assembly increases the reverse thrust lever operating load by approximately 6 pounds in a decrease-reverse-thrust-power direction only. The increased load is achieved by applying a resisting moment at the engine power control lever bellcrank for a few degrees corresponding to the lower end of the reverse idle range. This added load (feel) enables the pilot to stop the reverse thrust levers just within the idle range with the reverser deployed.

Auto throttle clutch assemblies are mounted below the engine power control levers in the control pedestal. These clutches are related to manual control of engine power only

by the necessary movement of the engine power control levers to release each clutch from auto throttle control and by the pulleys that translate engine power control lever movement with cables to the cable tension regulators (Ref. Fig. 4).

Movement of 0.80 degree of rotation in either direction from the neutral position of manual input is necesssary to release the auto throttle clutch to operate the controls (Ref. 22-30-00) manually.

Control lever switches, zone 210, are mounted below the clutch assembly in the control pedestal. Each cluster of switches has a set of six cams which are connected to the clutch assembly pulley by a push rod and a bellcrank. Each set of cams operates 12 microswitches used to control power plant and other system functions (Ref. Fig. 5).

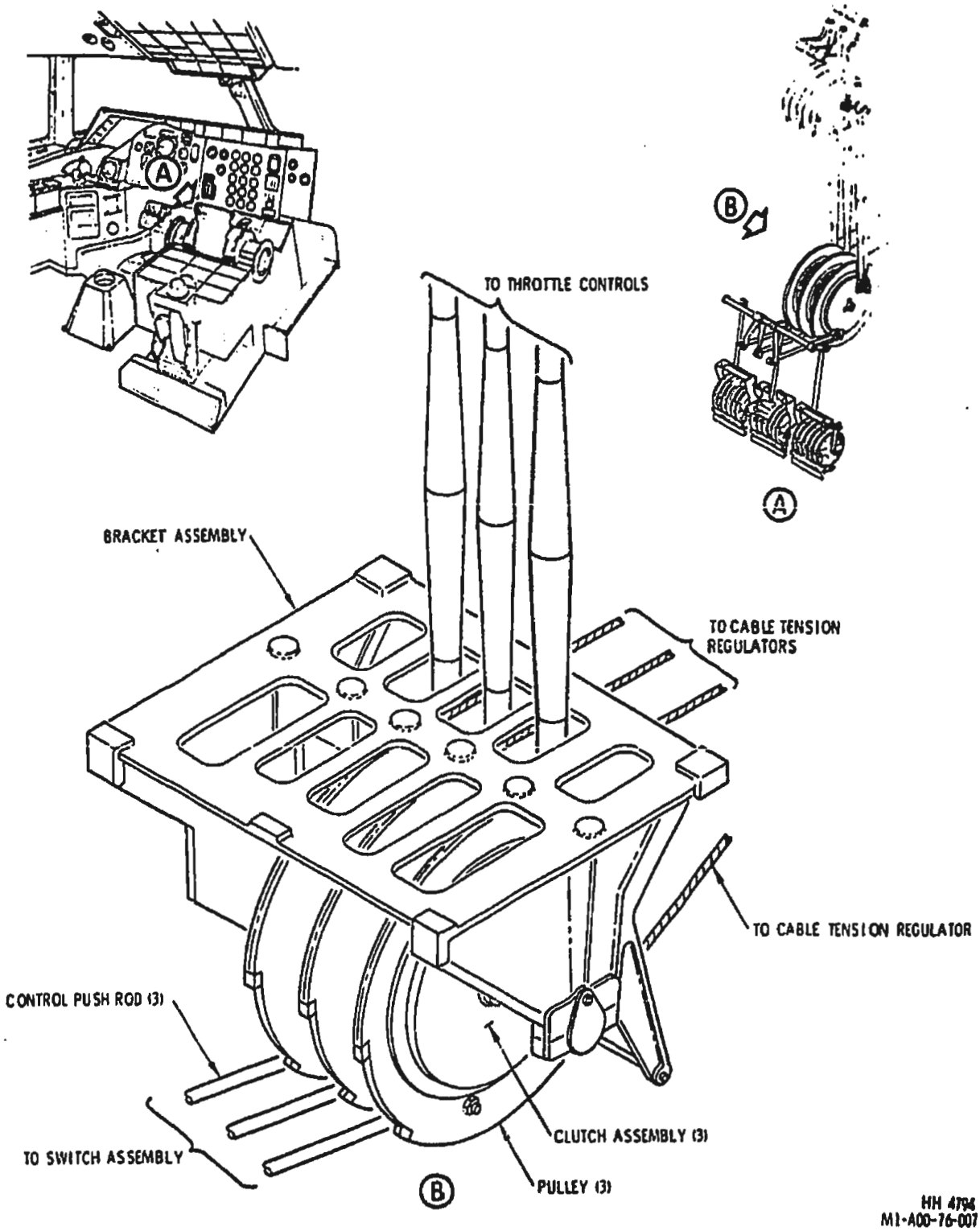
Engine reverse thrust and ground idle switches are included in the cluster of cam-operated switches for each engine. The engine reverse thrust switch for each engine is set to be closed between 1 and 39-1/2 degrees movement at the engine fuel control unit input box. Actuation of the switch is necessary to deploy the reverser (Ref. 78-31-00). The ground idle switch is set to be closed between 38-1/2 and 65 degrees (at input box) for engine ground idle power setting. This switch completes the circuit for the ground idle reset solenoid on the ground.

4. Engine Power and Thrust Reverser Control Linkage

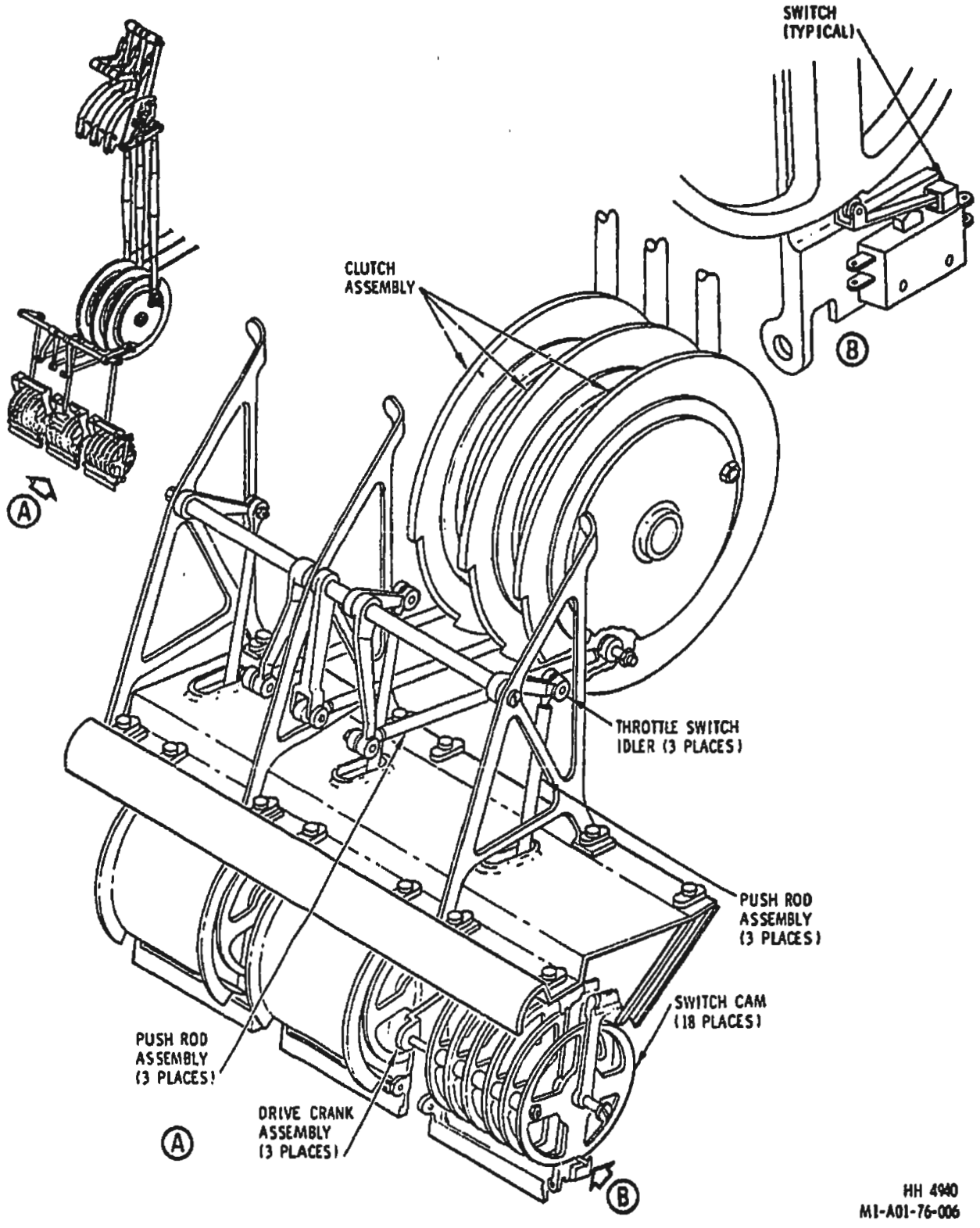
A. Description

Control of engine power in forward and reverse thrust is by movement of the engine power control levers in the flight station. Movement is transmitted, through the aircraft and engine-mounted control linkages, to the air throttle lever of the fuel flow regulator (Ref. 73-21-00).

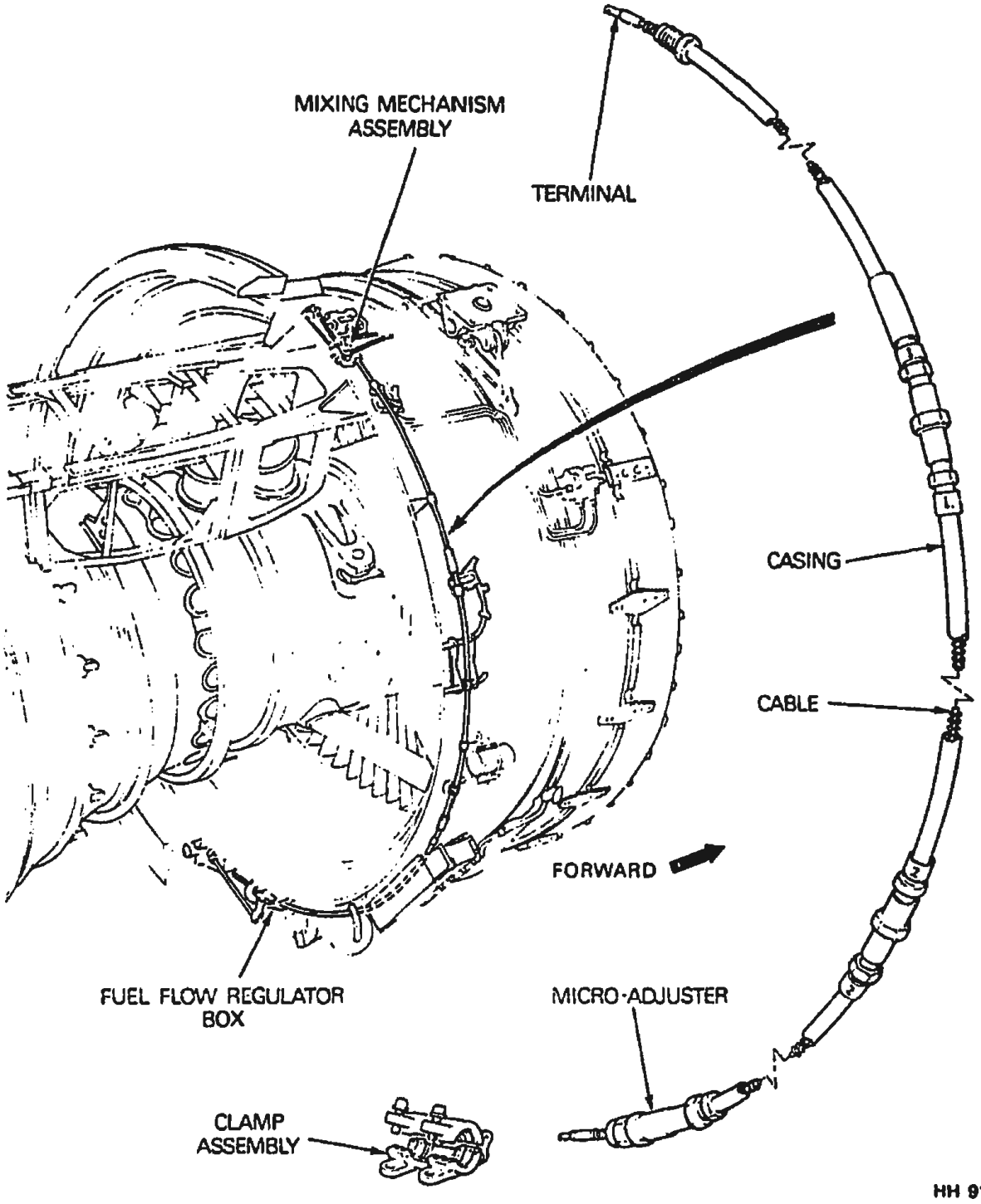
The engine-mounted units (Ref. Fig. 6) of the system are located on the low-pressure compressor case, zones 412, 422, and 432. They consist of a mixing mechanism assembly, mounted at the top center position, and a fuel flow regulator control box, mounted on the high-speed external gearbox input drive housing. The mixing mechanism assembly is connected to the aircraft control system by two control rods and to the fuel flow regulator box by a cable and casing assembly. The control linkage is completed by a connecting link from the fuel flow regulator box to the air throttle lever.



Clutch Assembly
Figure 4



Control Switches
Figure 5



Engine Power and Thrust Reverser Control Linkage
Figure 6

The mixing mechanism assembly (Ref. Fig. 7) consists of an input lever, a rack and gear sector, a cam, a thrust reverser select lever, a baulk lever, and two baulk blocks. The cam and gear sector are mounted on the same pivot as the input lever, so that any movement imparted to the input lever is transmitted simultaneously to the cam and gear sector and, therefore, the rack. The baulk blocks are secured to the cam. The thrust reverser select lever and baulk lever are mounted on the same pivot, which is an integral part of the mixing mechanism assembly.

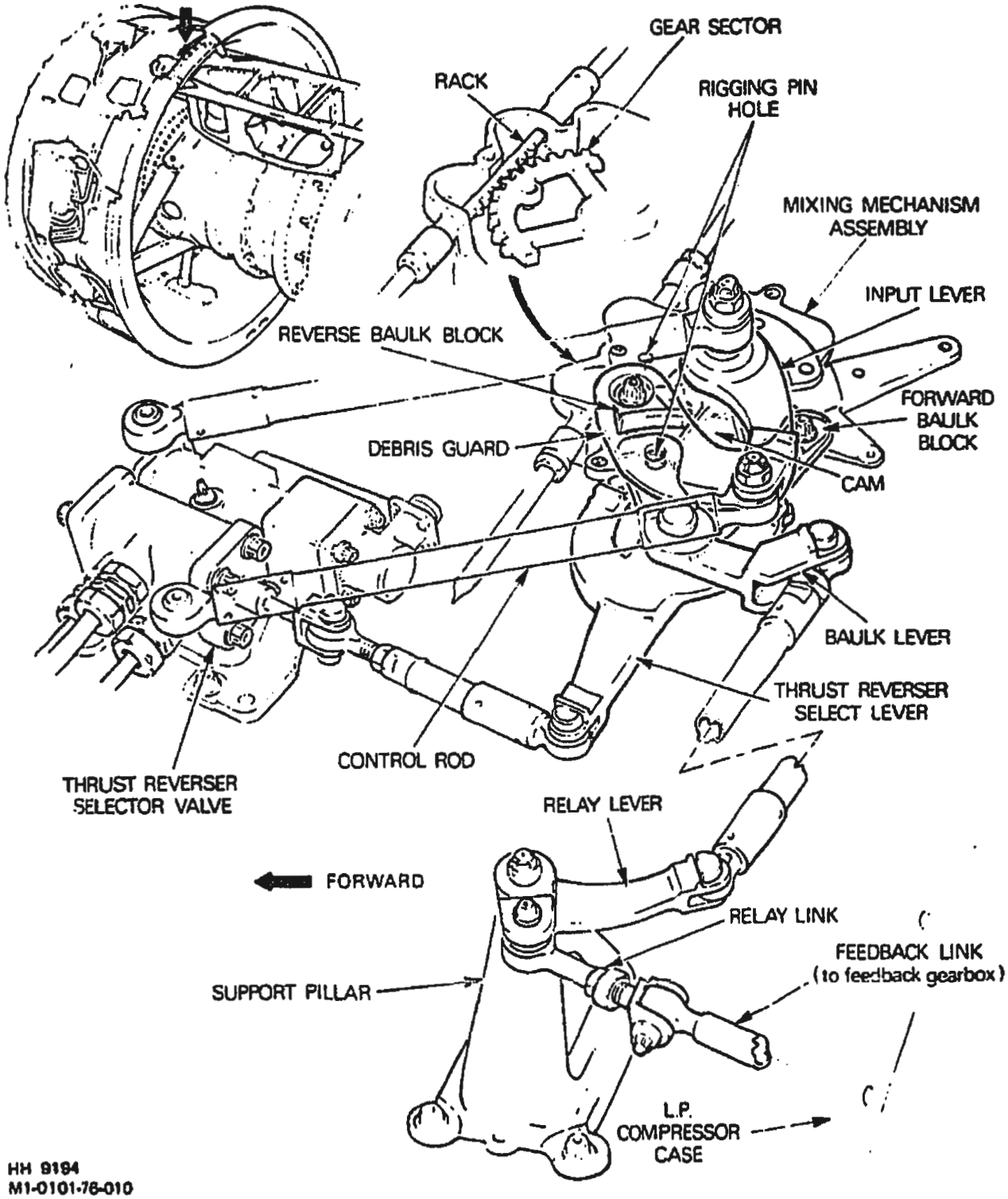
On engines incorporating SB76-2141 (Introduction of Debris Guard),
a guard is fitted to the mixing mechanism assembly.

Rollers, fitted to two arms of the select lever, contact the cam and act as cam followers. Therefore, movement of the cam positions the output arm of the select lever to operate the thrust reverser select valve (Ref. 78-30-00).

The baulk lever operates in conjunction with the two baulk blocks. When reverse thrust is selected and the translating cowl is moving rearwards, the reverse baulk block contacts the baulk lever and prevents engine power increases until the translating cowl reaches the mid-travel position. When forward thrust is selected and the translating cowl is moving forwards, the forward baulk block contacts the baulk lever and prevents engine power increase until the translating cowl reaches the 25-percent travel position. The baulk lever is operated by a feedback mechanism consisting of a control rod connected to a relay lever, which is mounted on a support pillar on the low-pressure compressor case, and a relay link that connects the relay lever to the feedback link (Ref. 78-30-00) of the thrust reverser translating cowl feedback gearbox.

The cable and casing assembly (Ref. Fig. 6) comprises a cable that slides in a rigid casing. The casing is in three sections that are secured to each other and to the mixing mechanism assembly by screwed connectors, and to the fuel flow regulator box by a clamp assembly. The interconnecting casing connectors are numbered to aid assembly, and the casing is supported by brackets around the right-hand side of the low-pressure compressor case. The cable is connected to the mixing mechanism assembly and fuel flow regulator box by slotted terminals which mate with slotted end fittings on the racks.

A micro-adjuster which can be screwed in or out, incorporated in the casing connected to the fuel flow regulator box, provides for adjustment between the cable and casing.



Mixing Mechanism Assembly
Figure 7

The fuel flow regulator box (Ref. Fig. 8) comprises a rack and gear sector and an output lever.

On engines with Telflex S.B.3393101-76-2, Mod ECN 27712 and 27885 (Rolls-Royce S.B.76-4016),
F.F.R. box with introduction of rack loader - the rack is spring loaded into engagement with the gear sector to prevent excessive wear.

The output lever is secured to the same pivot as the gear sector. Movement of the mixing mechanism assembly is transmitted by the cable to the fuel flow regulator box rack, which rotates the gear sector and, therefore, the output lever. This movement is transmitted to the air throttle lever by the connecting link.

Indication of air throttle lever position for the aircraft integrated data system (AIDS) is provided by a throttle angle position transducer (Ref. 78-30-00), which is driven by the gear sector of the fuel flow regulator box.

An adjuster, incorporated in the connecting link, provides for altering the length of the link to give final adjustment during control rigging.

Rigging pin holes are incorporated in the mixing mechanism assembly, the cam, the baulk lever, the fuel flow regulator box and the fuel flow regulator air throttle.

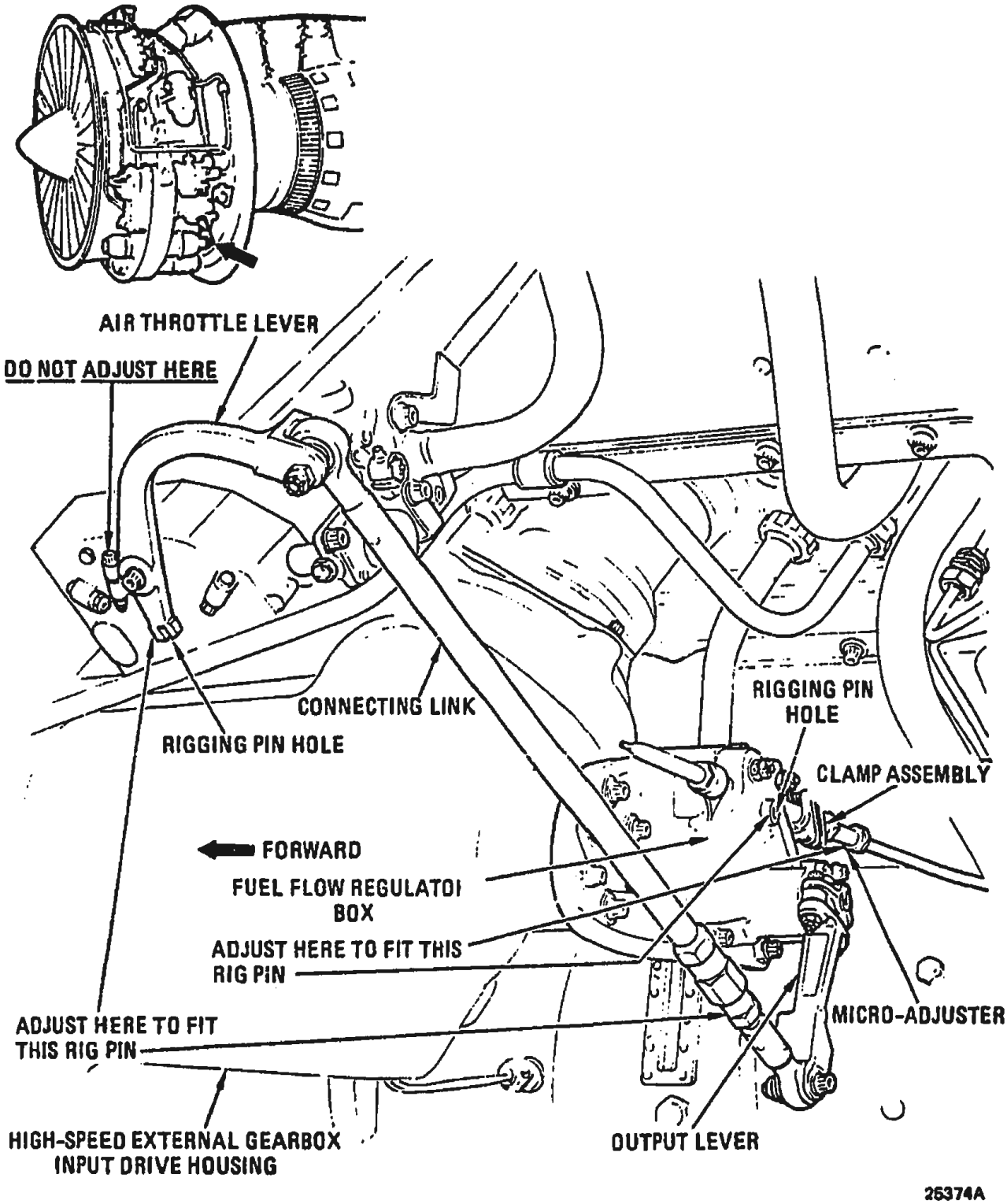
B. Operation

(1) Forward Thrust Control

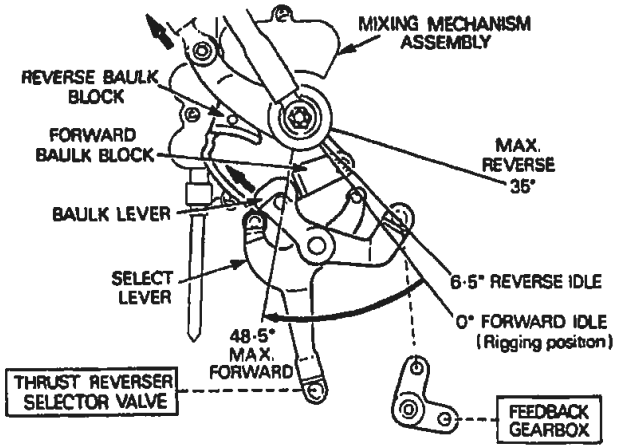
Movement of the flight station engine power control lever (Ref. Fig. 9, View A) from the forward idle position to the maximum power position, rotates the gear sector of the mixing mechanism assembly in a clockwise direction through an arc of approximately 48-1/2 degrees. This movement is transmitted through the racks and cable to the fuel flow regulator box, which actuates the output lever and connecting link to reposition the air throttle lever and increase engine power.

As the gear sector of the mixing mechanism assembly is rotated, the cam also rotates. The front roller of the reverse thrust select lever rides on the cam dwell to maintain the thrust reverser selector valve in the forward thrust position.

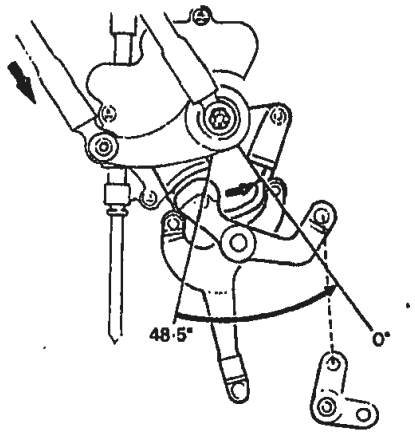
Movement of the engine power control lever back to the forward idle position from the maximum power position



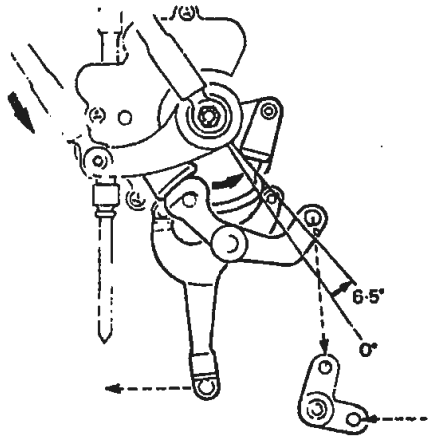
C C Fuel Flow Regulator Box
Figure 8



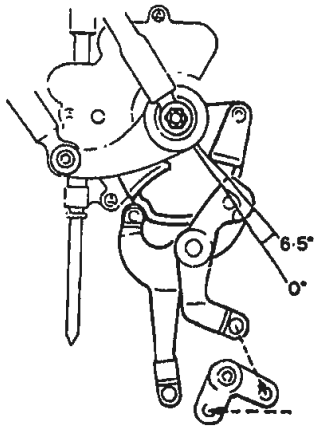
A. FORWARD THRUST (Engine at max. forward)



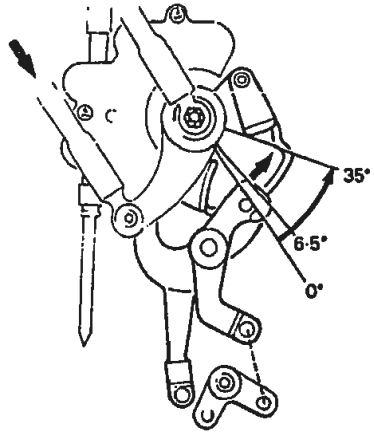
B. FORWARD THRUST (Engine at forward idle)



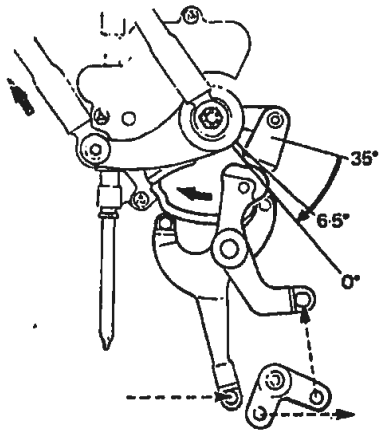
C. REVERSE THRUST SELECTED (Engine at reverse idle, translating cowl moving rearwards)



D. REVERSER FULLY DEPLOYED (Engine at reverse idle)



E. REVERSER FULLY DEPLOYED (Engine at max. reverse)



F. FORWARD THRUST SELECTED (Engine at forward idle, translating cowl moving forwards)

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25375A

Engine Power and Thrust Reverser Control Linkage Operation
Figure 9

rotates the mixing mechanism assembly gear sector in a counterclockwise direction (Ref. Fig. 9, View B) and thus repositions the air throttle lever in the forward idle power position.

(2) Reverse Thrust Selection

Movement of the flight station reverse thrust lever (Ref. Fig. 9, View C) from the forward idle position to the reverse idle position rotates the mixing mechanism assembly gear sector in a counterclockwise direction through an arc of approximately 6.5 degrees. The cam rotates and the front roller of the reverse thrust select lever rides off the cam dwell and the rear roller rides on to the dwell. The rocking action imparted to the output arm of the select lever is transmitted to move the thrust reverser selector valve to the reverse thrust position.

Movement of the reverse thrust lever is restricted until the thrust reverser translating cowl moves beyond the mid-travel position, when the feedback mechanism progressively removes the baulk lever (Ref. Fig. 9, View D).

(3) Reverse Thrust Control

Movement of the reverse thrust lever (Ref. Fig. 9, View E) from reverse idle to maximum reverse rotates the mixing mechanism assembly gear sector in a counterclockwise direction through an arc of approximately 28.5 degrees. This movement is transmitted through the racks and cable to the fuel flow regulator box to reposition the air throttle lever and increase engine power.

This movement is transmitted through the racks and cable to the fuel flow regulator box to reposition the air throttle lever and increase engine power.

Movement of the reverse thrust lever back to reverse idle from maximum reverse results in a clockwise rotation of the mixing mechanism assembly gear sector, and thus positions the air throttle lever to the reverse idle power position. As the cam rotates, the rear roller of the reverse thrust select lever rides on the cam dwell to maintain the thrust reverser selector valve in the reverse thrust position.

(4) Forward Thrust Selection

Movement of the reverse thrust lever (Ref. Fig. 9, View F) from reverse idle to forward idle rotates the mixing mechanism assembly gear sector in a clockwise direction. The cam rotates and the rear roller of the reverse thrust select lever rides off the cam dwell and the front roller rides on to the dwell. The output arm of the select lever moves the reverse thrust selector valve to the forward thrust position.

Movement of the engine power control lever is restricted until the thrust reverser translating cowl moves beyond the 25-percent travel position, when the feedback mechanism progressively removes the baulk lever and allows the engine power control lever to be moved into the forward thrust range.

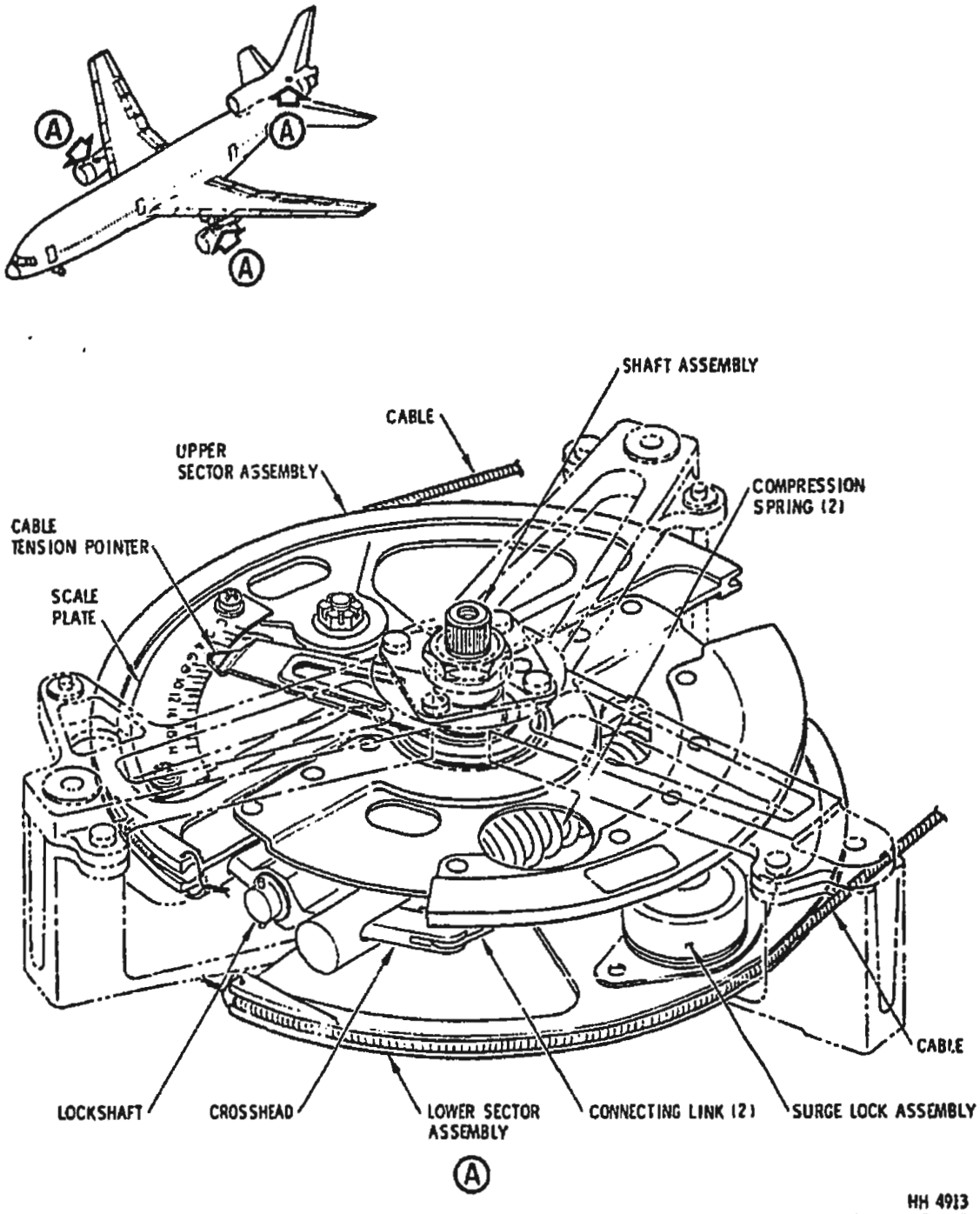
5. Throttle Cable Tension Regulator

A. Description and Operation

The throttle (control lever) cable tension regulator (Ref. Fig. 10), zones 452, 462, and 471, is a quadrant-type regulator mounted above the engine in the aircraft structure. The regulator automatically maintains cable tension to compensate for variations in cable to aircraft structure length due to thermal and mechanical factors. Functional components are located between two semicircular gear plate sector assemblies that pivot on a vertical shaft assembly.

Each sector is connected by a link to a crossbar which slides on the driving arm. Two compression springs act on the crosshead and introduce a force equal to the desired rig load of the system. A braking action of the crosshead and lockshaft device in the crossbar allows the springs to exert force only when the cable system is in neutral or when the tension is equal on both cables. The cable compensation is displayed on the scale plate iocated on the upper sector.

On aircraft 001-031 without SB76-010, a fail safe device (surge lock) is incorporated in the cable tension regulator. The surge lock assembly locks out the compression springs and converts the two sectors to a solid quadrant in case a cable breaks at any point in the system. The locking action as the result of a break could result in a change to the engine power setting. The change is limited to a maximum of 5 degrees angular travel.



Throttle Cable Tension Regulator
Figure 10

6. Engine No. 2 Throttle Control Motion Compensator Assembly

A. Description and Operation

The engine throttle (control lever) motion compensator assembly, zone 432, is a pantograph-type compensator located between the engine and the aircraft structure. The compensator is designed to absorb motion between the engine and the airframe without moving the engine mounted control. The compensator consists of a shaft assembly, two sets of parallel linkages, and a throttle control adjustable lever bellcrank assembly (Ref. Fig. 11).

The shaft assembly is rigidly attached to the airframe to provide a pivoting point for the connecting linkage.

An upper lever linkage rod from the cable tension regulator is connected to the main shaft upper lever on the motion compensator. The upper lever pivots about the shaft, translating regulator linkage movement to a parallelogram linkage rod. The opposite end of this rod is attached to one connection of the throttle control adjustable lever bellcrank assembly. Any movement of the bellcrank assembly is thus translated to the linkage rod that attaches to the engine-mounted controls.

Fine adjustment for connecting the interface controls is made with the eyebolt of the throttle control adjustable bellcrank assembly.

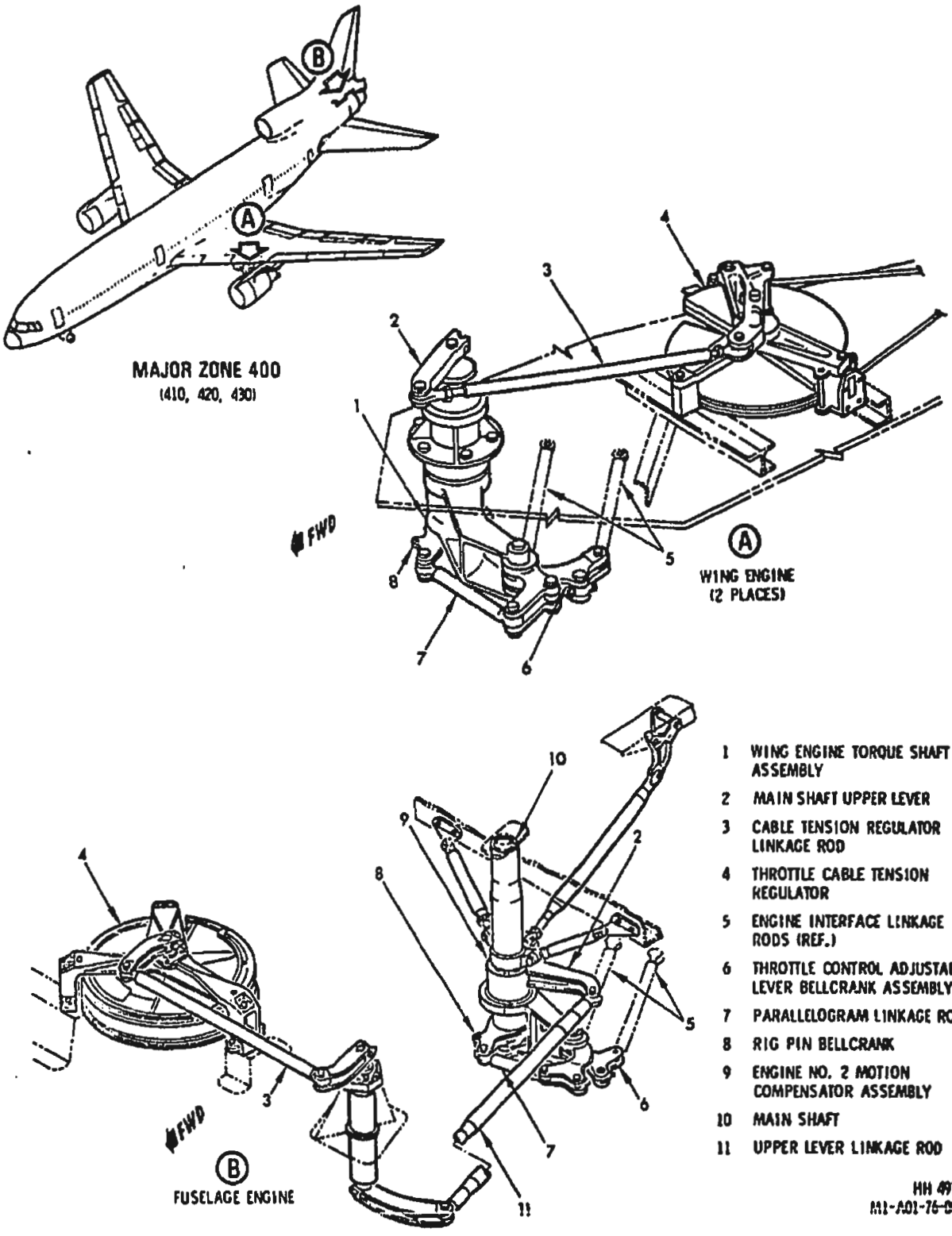
7. Wing Engine Torque Shaft Assembly

A. Description and Operation

The engine throttle (control lever) torque shaft assemblies, zones 412 and 422, are pantograph-type compensators strategically located to form a flexible connection between the engine and the aircraft structure. The torque shaft assemblies are designed to absorb motion between the engine and the airframe without moving the engine mounted control. Each assembly consists of a shaft assembly, two sets of parallelogram linkages and a throttle control adjustable lever bellcrank assembly (Ref. Fig. 11).

The shaft assembly is rigidly attached to the airframe to provide a pivoting point for the attaching linkage.

A linkage rod from the cable tension regulator is attached to the upper regulator lever on the shaft assembly. Lever rotation is translated to a parallelogram linkage rod. The opposite end of this rod is attached to one connection of



Engine Motion Compensator
Figure 11

the throttle control adjustable lever bellcrank assembly. Any movement of the bellcrank assembly is thus translated to the linkage rod that attaches to the engine-mounted controls.

Fine adjustment for connecting the interface controls is made with the eyebolt of the throttle control adjustable bellcrank assembly.

CENTER CONSOLE PEDESTAL - FAULT ISOLATION

1. General

The fault isolation diagrams in this section can be used for fault isolation any time a fault is reported or suspected. Before fault isolation is started, the PREREQUISITES listed on the diagram must be fulfilled.

If the flight crew reports a trouble using a FIRM Fault Code number, the number can be found in the FIRM Fault Code Cross Reference Table in the Chapter 76-INDEX.

The FIRM Fault Code Cross Reference Table includes the flight report (fault symptoms) and the exact Section, Figure, Sheet, and Block number where fault isolation should begin. (Refer to the L-1011 Maintenance Manual Introduction for a more detailed explanation on the use of fault isolation diagrams.)

If a fault is reported or suspected and no FIRM Fault Code is available, the function or fault indication can be found in the table below. When a diagram is selected in this manner fault isolation is started in Block 1.

2. Fault Isolation/Identification

Table 101 is a list of all fault isolation data in this section of the manual.

Center Console Pedestal Fault Isolation
Table 101

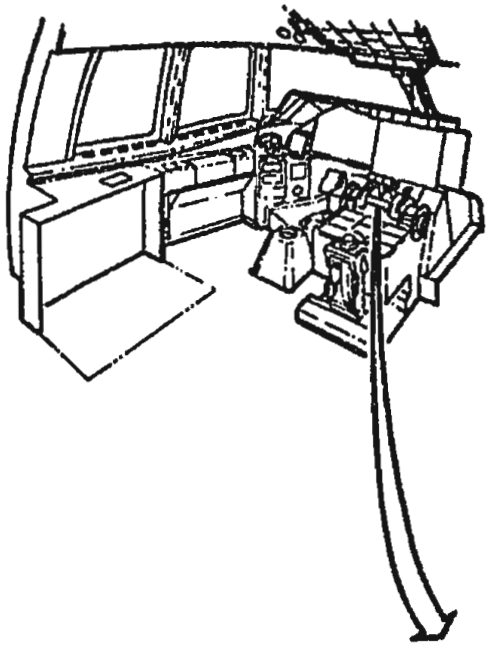
FIGURE	TITLE
101	Component Location Index
102	Component Locator
103	Center Console Pedestal Fault Isolation

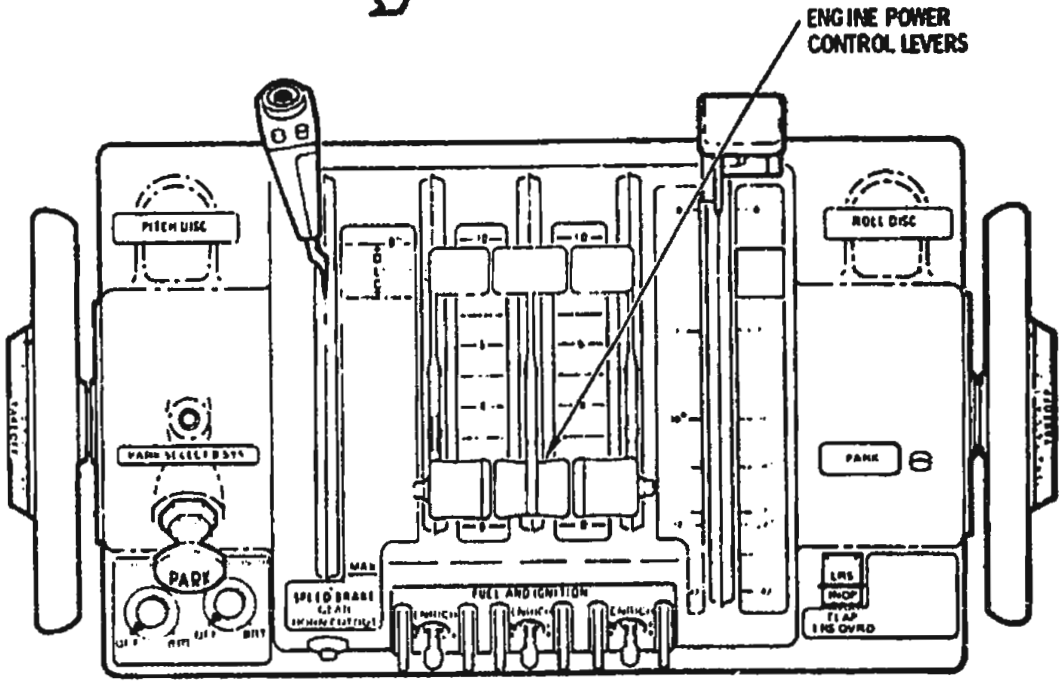
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CENTER CONSOLE PEDESTAL	1	FLT STATION/CTR CONSOLE	76-11-01

M1-0000-76-053

R Component Location Index
R Figure 101

R EFFECTIVITY: ALL
R
001B





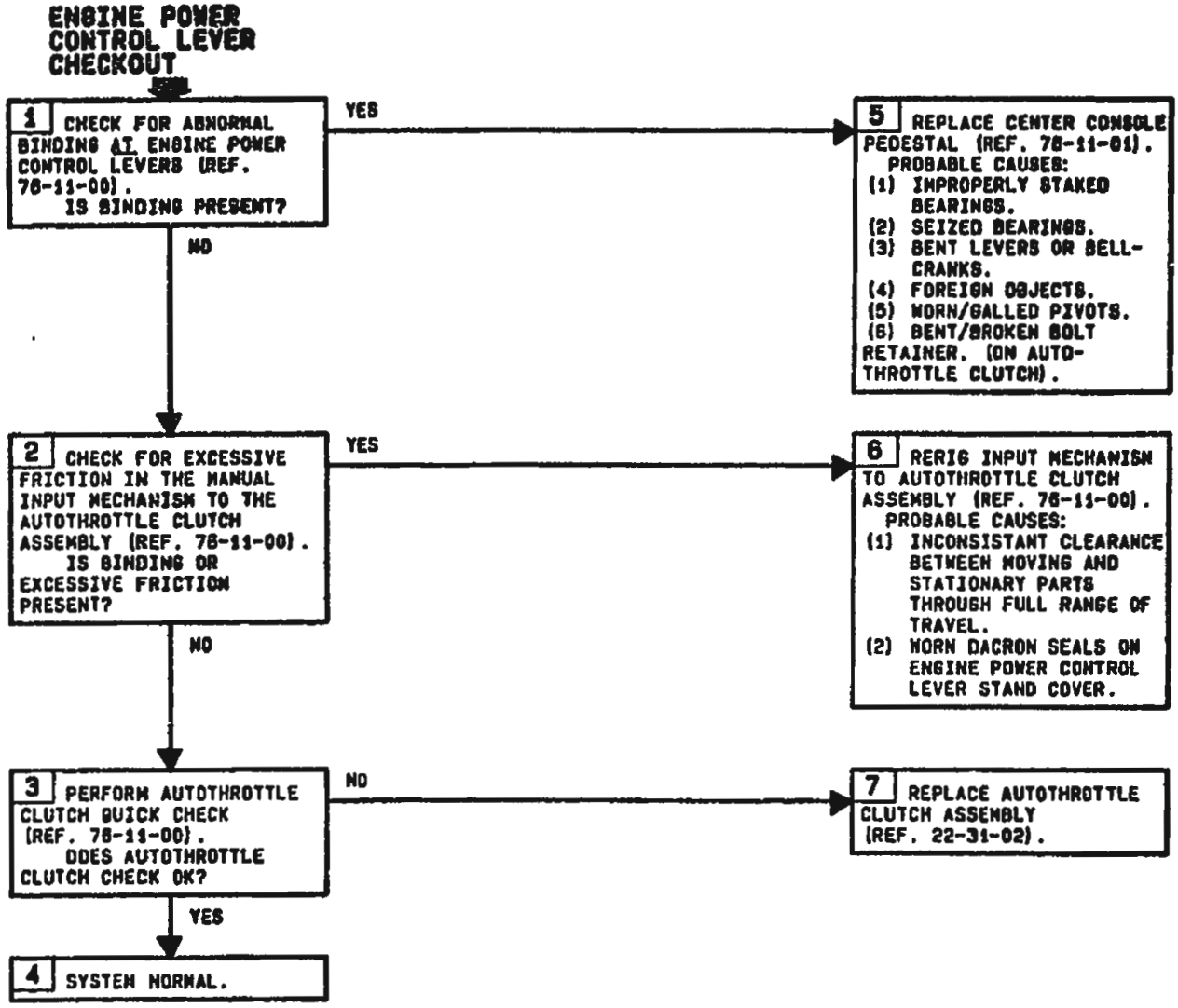
(CENTER CONSOLE)

M1-0001-76-054

R Component Locator
R Figure 102

PREREQUISITES

NONE


ENGINE POWER CONTROL LEVER CHECKOUT
1 CHECK FOR ABNORMAL BINDING AT ENGINE POWER CONTROL LEVERS (REF. 76-11-00). IS BINDING PRESENT?
YES
5 REPLACE CENTER CONSOLE PEDESTAL (REF. 76-11-01). PROBABLE CAUSES: (1) IMPROPERLY STAKED BEARINGS. (2) SEIZED BEARINGS. (3) BENT LEVERS OR BELL-CRANKS. (4) FOREIGN OBJECTS. (5) WORN/GALLED PIVOTS. (6) BENT/BROKEN BOLT RETAINER. (ON AUTO-THROTTLE CLUTCH).
NO
2 CHECK FOR EXCESSIVE FRICTION IN THE MANUAL INPUT MECHANISM TO THE AUTOTHROTTLE CLUTCH ASSEMBLY (REF. 76-11-00). IS BINDING OR EXCESSIVE FRICTION PRESENT?
YES
6 RERIG INPUT MECHANISM TO AUTOTHROTTLE CLUTCH ASSEMBLY (REF. 76-11-00). PROBABLE CAUSES: (1) INCONSISTANT CLEARANCE BETWEEN MOVING AND STATIONARY PARTS THROUGH FULL RANGE OF TRAVEL. (2) WORN DACRON SEALS ON ENGINE POWER CONTROL LEVER STAND COVER.
NO
3 PERFORM AUTOTHROTTLE CLUTCH QUICK CHECK (REF. 76-11-00). DOES AUTOTHROTTLE CLUTCH CHECK OK?
NO
7 REPLACE AUTOTHROTTLE CLUTCH ASSEMBLY (REF. 22-31-02).
YES
4 SYSTEM NORMAL.

M1-0001-76-055

R Center Console Pedestal Fault Isolation
R Figure 103

CR ENGINE CONTROL SYSTEM
CR MAINTENANCE PRACTICES

CR 1. Throttle Stagger and Thrust Lever Rig Check

CR A. Throttle stagger or thrust lever misalignment is a major problem and has a major affect on fuel system component removals. Fuel flow regulators (FFR) and fuel pumps are usually the units removed. However, throttle stagger malfunctions in these units are very seldom confirmed. In other words, changing FFR's and fuel pumps is not always effective in correcting this problem.

CR B. Because it is the easiest correction of all, check the thrust lever rig first. This is a relatively simple thing to check and is certainly easier than changing an FFR or a fuel pump, and it can yield startling results--Here's how it's done.

CR C. This procedure tests the thrust lever rig from cockpit to FFR.

CR D. Preparation for check

CR (1) Take the necessary precautions to insure no one is injured during the check. Tag controls accordingly so that check can be made easily, accurately, and safely. See Chapter 76-11-00, Adjustment/Test for details.

CR (2) Four rig pins are required.

CR E. The Rig Check

CR (1) Operate thrust lever from idle to max power in a smooth movement several times, stopping against the idle stop.

CR (2) Raise thrust reverse lever to approximately 50° and return to stowed position.

CR (3) Insert rig pins in mixing mechanism assembly (upper teleflex gearbox). See Figure 201.

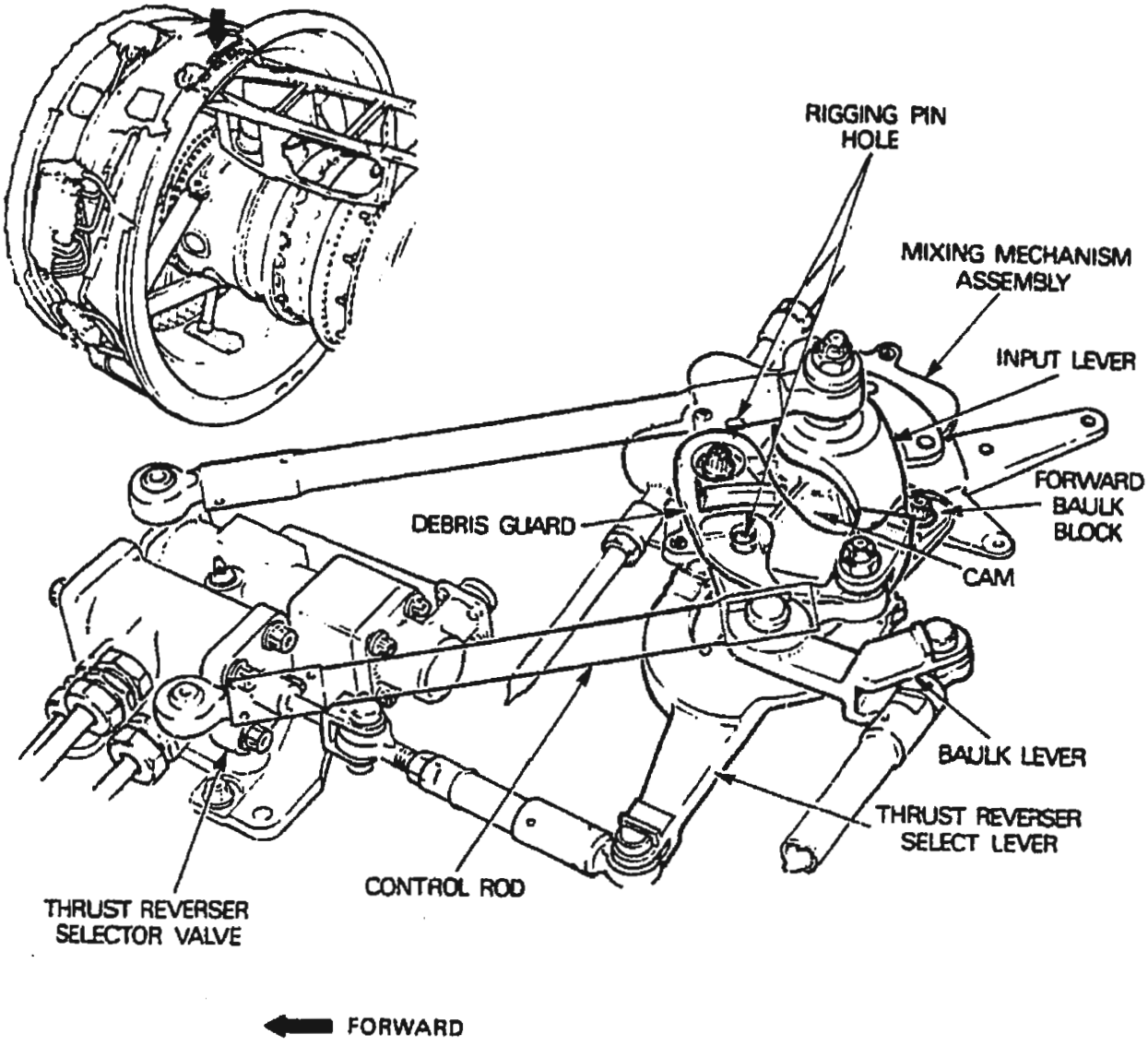
CR NOTE: Pins should fit freely.

CR (4) With rig pins in mixing mechanism assembly, install rig pin in fuel flow regulator box (lower teleflex gearbox).

CR (5) With above rig pins (3) installed, install rig pin in
CR throttle lever and throttle box of FFR. See Figure
CR 202.

CR NOTE: Rig pins should fit freely in the rig pin holes. If
CR they do not, check the RB211 Maintenance Manual,
CR Chapter 76, for detailed rigging instructions.

CR NOTE: Keep in mind, if the engine is not rigged properly,
CR changing the FFR is not the solution because there is
CR not sufficient range adjustment in the FFR to
CR compensate for a malrigged thrust lever system.



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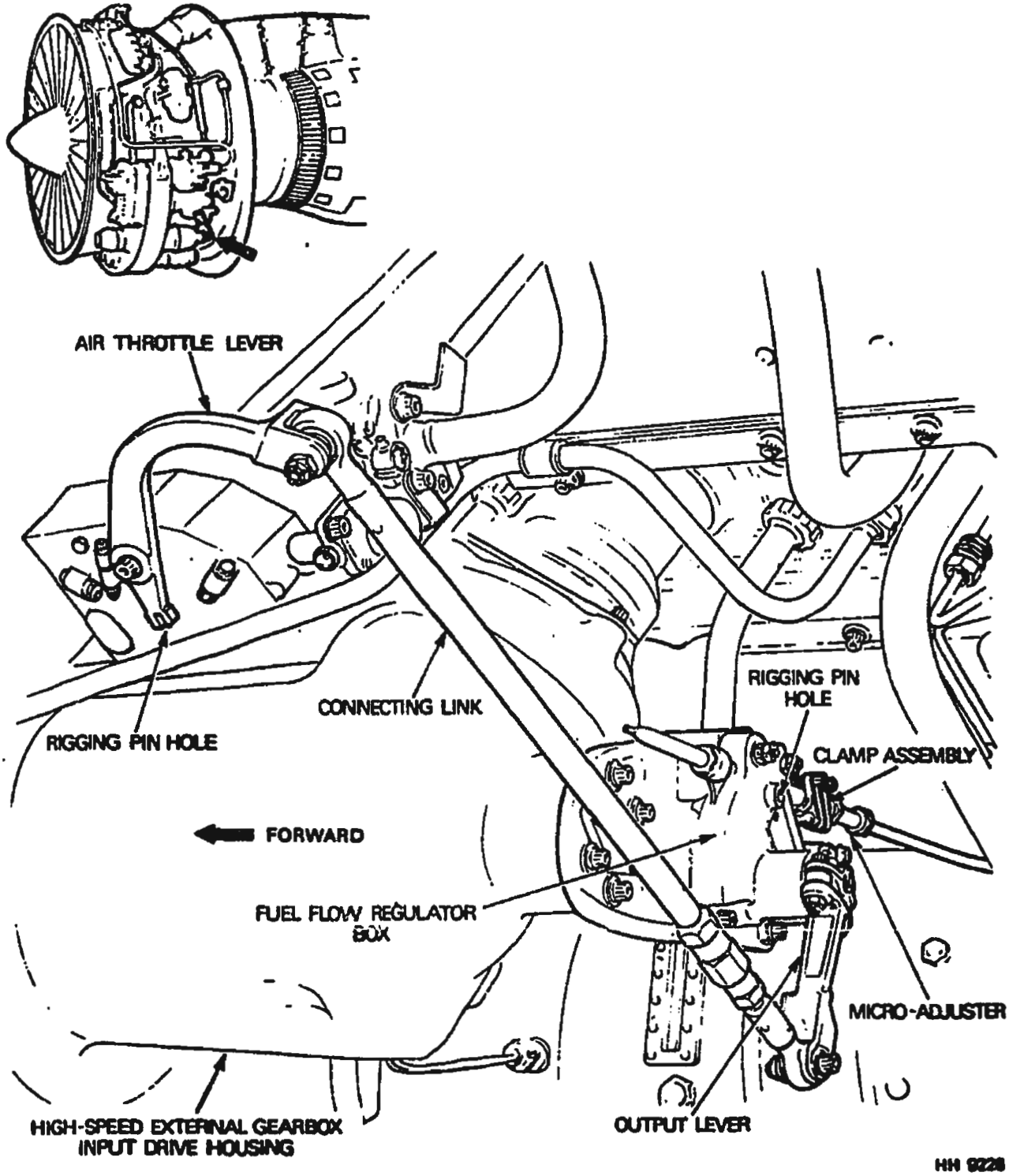
CR
CR

Rig Pin Locations - Mixing Mechanism
Figure 201

R EFFECTIVITY: ALL
R
001B



CR
CR

Rig Pin Locations - FFR
Figure 202

R EFFECTIVITY: ALL
R
001B

ENGINE CONTROL SYSTEM - ADJUSTMENT AND TEST

1. Adjustment/Test

This section provides procedures to perform a rigging static check (Ref. Para. 4), and a rigging check and adjustment (Ref. Para. 5).

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or British Spec DTD. 189A 22 SWG (OMAT ITEM NO. 238), or equivalent

Engine Power Control Rigging Kit, PN B996, or equivalent

Engine Linkage Rig Pin (2) Rolls-Royce Ltd., PN UT993, or equivalent

Air Throttle Lever Rig Pin, Rolls-Royce Ltd., PN UT.1150/1 (Avdel PN 3101-0310 with warning pennant)

Spring scale (0 to 10 lb)

R Spring scale (0 to 16 oz)

Bolt, 5-inch, 3/8-24

R Dry film lubricant British Spec/Ref PL 198, OMat No. 4/20

R Degreasing fluid (inhibited and stabilized 1.1.1.
R trichloroethane) British Spec/Ref ES.4487; 1969, American
R Spec/Ref M.1-T-81533, OMat Item No. 1/21

R Small, clean brush (dry film lubricant)

3. Referenced Procedures

21-00-00	Air Conditioning - Maintenance Practices
24-00-00	Electrical Power - Maintenance Practices
24-41-00	External Power/Ground Service Systems - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
29-21-00	Ram Air Turbine - Maintenance Practices

34-14-00	Central Air Data Computer System - Maintenance Practices
34-32-00	Radio Altimeter System - Maintenance Practices
71-00-00	Power Plant - Adjustment and Test
71-11-00	Engine No. 1 and No. 3 Cowling - Servicing
71-11-01	LH Hinged Cowl - Removal and Installation
71-12-01	LH and RH Lower Hinged Cowl - Servicing
71-12-05	LH and RH Upper Hinged Cowl - Servicing
73-21-01	Fuel Flow Regulator - Maintenance Practices
78-30-00	Thrust Reverser - Maintenance Practices
78-30-00	Thrust Reverser - Adjustment and Test

4. Rigging Check

A. Static Check

The rigging static check provides a means of checking the rigging without operating the engines or disconnecting any cables.

(1) Set engine power control levers against idle stop.

(2) Raise reverse thrust control lever (approximately 50 degrees), then lower to fully down position.

(3) Insert rig pin at engine teleflex input control box gear. If pin installs easily, aircraft section of system is rigged. Remove rig pin.

NOTE: Reference Paragraph 5G for engine linkage rigging.

B. Engine Power Control Lever Friction Test

This test checks for excessive friction in the linkage from the engine power control lever to the auto throttle clutch.

Alternate Method No. 1

(1) Remove throttle stand cover (Ref. 76-11-01).

(2) Disconnect vertical push rods from engine power control levers (3 places) and stow rods to prevent interference with engine power control lever movement.

(3) With 0-16 oz. spring scale, apply a force normal with engine power control lever travel to move the lever from idle to full thrust and from full thrust back to idle. Maximum force shall not exceed 12 oz.

(4) Reinstall vertical push rods and throttle stand cover (Ref. 76-11-01).

Alternate Method No. 2

(1) Preparation

(a) Turn on electrical power (Ref. 24-00-00).

(b) Verify that equipment cooling is on (Ref. 21-00-00).

(c) Verify that the following navigation systems are on:

Central Air Data Computer System (Ref. 34-14-00)

Radio Altimeter System (Ref. 34-32-00)

(d) On pilots overhead circuit breaker panel CB1, zone 210, verify that the following circuit breakers are closed.

AVIONICS FLIGHT CONTROL SYSTEM

AUTOTHROT SERVO AC (A1)

AUTOTHROT SERVO DC (A2)

No. 1 SYSTEMS

• AFCS CMPTR (A3)

• AFCS PNL (A4)

FCES - COMPUTER - AC and AOA (B5)

NO. 2 SYSTEMS

• AFCS CMPTR (A21)

• AFCS PNL (A22)

AFCS PNL MEM (H12)

(e) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 215, verify that circuit breaker FLIGHT STATION MISC - R AOA (F1) is closed.

(f) On pilots overhead circuit breaker panel CB1 open and tag MISC RAT AUTO DEPLOY (L3).

(g) Install rat ground safety lock (Ref. 29-21-00).

(h) Simulate "airborne" condition in one of the following manners:

Remove AFCS/MLG accessory unit.

Open MLG GND SENSE (L8) and GEAR TRUCK LEVEL (F16) on FE/SO overhead circuit breaker panel CB2.

(i) Cover both AOA sensor probes to prevent probe drift.

(j) On pilots overhead circuit breaker panel CB1, open No. 1 NAVIGATION RADIO ALTM (D4).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM.

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES AND MAIN GEAR DOORS ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

(k) Turn on hydraulic power (Ref. 29-11-00).

WARNING: VERIFY THAT TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

(l) Set flaps to zero degrees.

(m) On glareshield panel, verify that both AP switches are OFF and FD switches are ON.

(n) On all mode selector panels, set mode selector switch to ATT. When both ADI ATT flags go

out-of-view and ATT 3 legend goes out, continue test.

(2) Test for Aircraft Equipped with a Digital Air Data Computer (DADC).

(a) On FCES panel, verify that ATS 1 and 2 switchlights are on (dark).

WARNING: ENSURE THAT AUTOTHROTTLE CLUTCH ASSEMBLY AREA IS CLEAR OF PERONNEL AND GROUND EQUIPMENT.

(b) On glareshield panel, set autothrottle IAS knob to 300 knots.

(c) Set all engine power control levers to approximately 25% of full power position.

(d) Attach 0 to 10 lb. spring scale to engine power control lever knot oriented to prevent forward motion of lever with scale normal to lever direction of travel.

(e) On both ADC, simultaneously depress PUSH-TO-TEST switches for one second and release.

(f) When TEST IN PROGRESS lights on ADC start to flash [approximately 10 seconds after start of test in Step (e)], simultaneously depress PUSH-TO-TEST switches for one second and release to initiate programmed airspeed output.

(g) Depress ATS 1 and 2 switchlights to OFF, then to on to clear FAIL.

(h) At approximately 1.8 minutes after initiating programmed airspeed output, as IAS is decreasing toward 280 knots, on glareshield panel, press autothrottle AT switchlight to ON.

(i) Note spring scale force required to hold engine power control levers stationary.

(j) Simultaneously push PUSH-TO-TEST switches on both ADC.

(k) Repeat Steps 4B(2)(c) through 4B(2)(j) with engine power control levers positioned at approximately 50%, 75%, and 90% of full power position.

(l) With engine power control levers at approximately 90% of full power position, reorient spring scale

to prevent aft movement of levers with scale normal to lever direction of travel.

In the following steps, it will be necessary to hold the engine power control levers to prevent them from moving forward until the autothrottle servo attempts to move them aft.

(m) On both ADC, simultaneously depress PUSH-TO-TEST switches for one second and release.

(n) When TEST IN PROGRESS lights on ADC start to flash [approximately 10 seconds after start of test in Step (m)], aimultaneously depress PUSH-TO-TEST switches for one second and release to initiate programmed airspeed output.

(o) Depress ATS 1 and 2 switchlights to OFF, then to ON to clear FAIL.

(p) At approximately 1.8 minutes after initiating programmed airspeed output, as IAS is decreasing toward 280 knots, on glareshield panel, press autothrottle AT switchlight to ON.

(q) As airspeed begins to increase through 300 knots note spring scale force required to hold engine power control levers stationary.

(r) Repeat Steps 4B(2)(k) through 4B(2)(p) with engine power control levers positioned at approximately 75%, 50%, and 25% of full power position. Spring scale reading at all positions should be within 1.5 to 2.5 lbs.

(s) On the left engine power control lever, depress auththrottle AT disengage switch twice. Autothrottle AT switchlight goes off.

(3) Test for Aircraft Equipped with a Central Air Data Computer (CADC)

(a) Correct airdata testers to CADC systems No. 1 and 2. On each tester, establish an IAS of 170 knots (Ref. 34-14-00).

(b) On THRUST panel, set IAS knob to 180 knots.

(c) Set all engine power control levers at approximately 25% of full power position.

(d) Attach 0 to 10 lb. spring scale to engine power control lever knot oriented to prevent forward motion of lever with scale normal to lever direction of travel.

(e) On THRUST panel, set ATS switch to ON. ATS switch remains in ON position. All engine power control levers will try to drive forward to maximum thrust limit and stop. Both ADI FAST/SLOW displays indicate SLOW.

(f) Note spring scale force required to hold the engine power control levers stationary.

(g) On left engine power control lever depress autothrottle AT disengage switch twice. Autothrottle AT switchlight goes off.

(h) Repeat Steps 4B(3)(d) through 4B(3)(g) with engine power control levers positioned at approximately 50%, 75%, and 90% of full power.

(i) On each CADC tester establish an IAS of 200 knots.

In the following steps, it will be necessary to hold the engine power control levers to prevent them from moving forward until the autothrottle servo attempts to move them aft.

(j) With engine power control levers positioned at approximately 90% of full power position, reorient spring scale to prevent aft movement of levers with scale normal to lever direction of travel.

(k) On thrust panel, set ATS switch to ON. ATS switch remains in ON position. All engine power control levers will try to drive backward to minimum thrust position. Both ADI FAST/SLOW displays indicate FAST.

(m) Note spring scale force required to hold engine power control levers stationary.

(n) On left engine power control lever autothrottle AT disengage switch twice. Autothrottle AT switchlight goes off.

(o) Repeat Steps 4B(3)(j) through 4B(3)(n) with engine power control levers at approximately 75%, 50%, and 25% of full power position.

(p) Spring scale readings at all positions should be within 1.5 to 2.5 lbs.

(4) Test Completion

(a) Return aircraft to "on ground" condition in the following manner as applicable (Ref. Para. 4B Alt Method No. 2 Step (1)(h):

Install AFCS/MLG accessory unit

Close MLG GND SENSE (L8) and GEAR TRUCK LEVEL (F16) on FE/SO overhead circuit breaker panel CB2

(b) Remove rat ground safety lock (Ref. 29-21-00).

(c) On pilots overhead circuit breaker panel CB1, close circuit breakers MISC RAT AUTO DEPLOY (L3) and NO. 1 NAVIGATION RADIO ALTM (D4).

(d) Turn off electrical power (Ref. 24-00-00).

(e) Remove cover from AOA sensor probes.

(f) Turn off hydraulic power (Ref. 29-11-00).

C. Autothrottle Clutch Quick Check

(1) Position the engine power control levers at center of throttle stand cover.

(2) Move engine power control levers forward approximately 0.5 inch and release.

(3) Move engine power control levers rearward approximately 0.5 inch and release.

(4) When released, engine power control levers should spring back approximately 0.125 inch showing autothrottle clutch engaging and disengaging mechanisms are operating properly.

5. Rigging Check and Adjustment

The rigging check and adjustment procedures are presented separately for each section of the engine power control system. Each section may be rigged individually without disturbing the remainder of the system. The preparation and completion procedures must be performed before and after any rigging check and adjustment. Following are the individual procedures:

PARAGRAPH	PROCEDURE
5A	Rigging Preparation
5B	Engine Power Control Levers to Autothrottle Clutch Rigging
5C	Control System Switch Assembly Rigging
5D	Cable Loop and Cable Tension Regulator Rigging
5E	Thrust Reverser Selector Valve Linkage Rigging
5F	Thrust Reverser Feedback Linkage Rigging
5G	Engine Power Linkage Rigging
5H	Rigging Completion

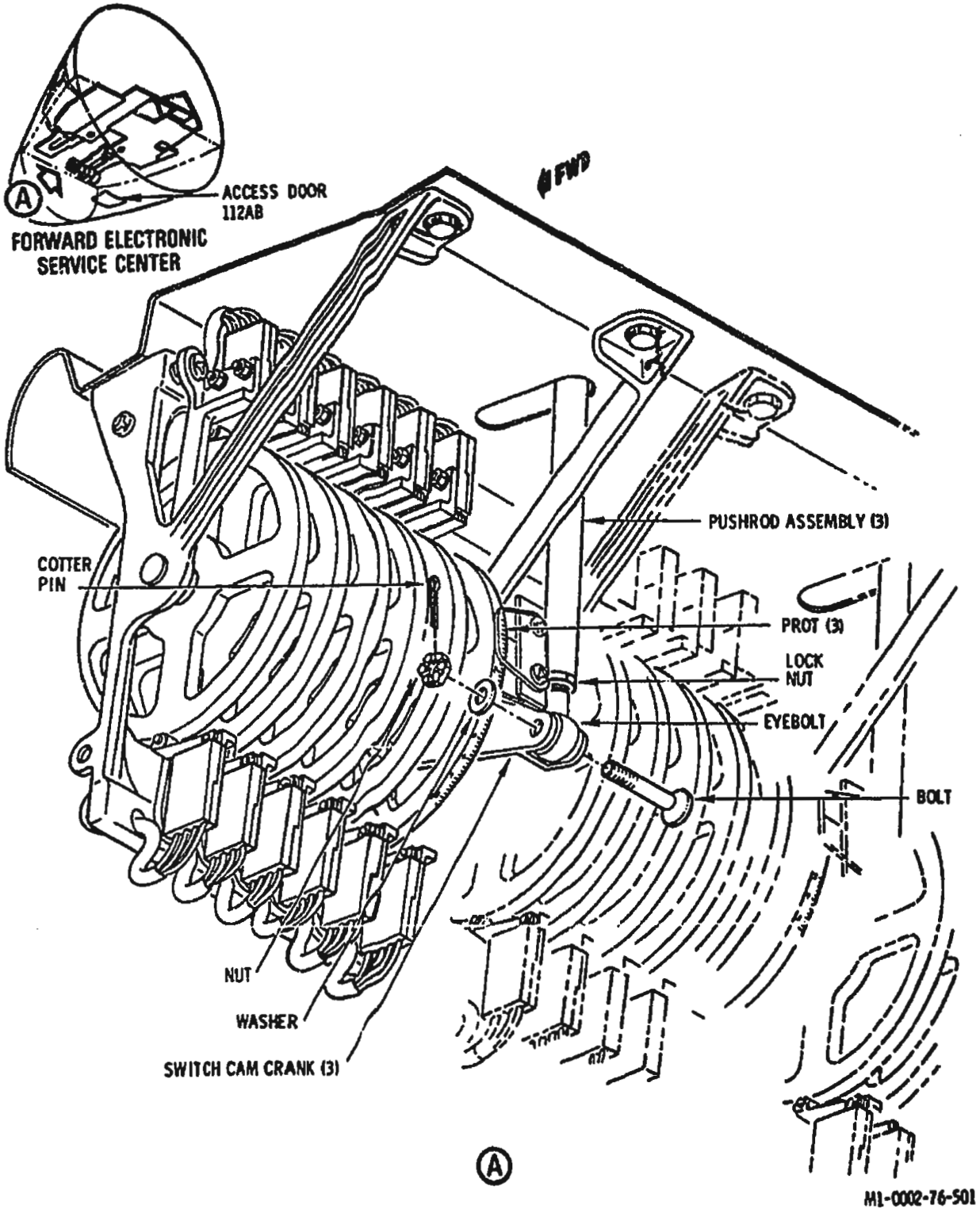
NOTE: If all tension is to be removed from cable system, install a suitable spacer around the tension regulator lockshaft before relieving the tension to prevent bottoming of the regulator. Attach a red flag to the spacer to assure that it is removed after the cable system has been re-tensioned. Avoid twanging of the cables or sudden release or application of cable tension because it can actuate the surge lock on the cable tension regulator. To release the surge lock, apply equal tension on both the power-advance and power-retard cables until the indicator on the regulator begins to move. Release tension on both cables slowly.

A. Rigging Preparation

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers RAOA (F1) and T/O AURAL WARNING (H7).

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable circuit breaker START AIR VALVE (N3, N9, or N15).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers AUTO THROTTLE SERVO (A1), SPEED CONT (A2), FCES - COMPUTERS - AC & L - AOA (B5), and LANDING GEAR WARN HORN (L12), and appropriate THRUST REVERSE circuit breakers (H16, H17, and H18).



R
R

Switch Installation Rigging
Figure 501

EFFECTIVITY: ALL

001B

(2) On pilots center console, zone 210, place warning tags on APU/GROUND AIR TO REVERSER toggle switches. Tag appropriate ENGINE START panel switchlights.

(3) Place engine power control levers (Ref. Fig. 502) in idle (0-degree) position and tag.

(4) Raise reverse thrust control levers (approximately 50 degrees) and return to fully down (0-degree) position.

(5) If required, remove left-hand hinged cowl 413A or 423A (Ref. 71-11-01) and right-hand hinged cowl 414A or 424A (Ref. 71-11-02) for engines No. 1 and 3. Open hinged cowls 433AL and 434AR (Ref. 71-12-01) and 433DL and 434DR (Ref. 71-12-05) for engine No. 2.

(6) Install thrust reverser mechanical locks (Ref. 78-30-00, Maintenance Practices) on engine.

B. Engine Power Control Levers to Autothrottle Clutch Rigging

(1) Perform rigging preparation (Ref. Para. 5A).

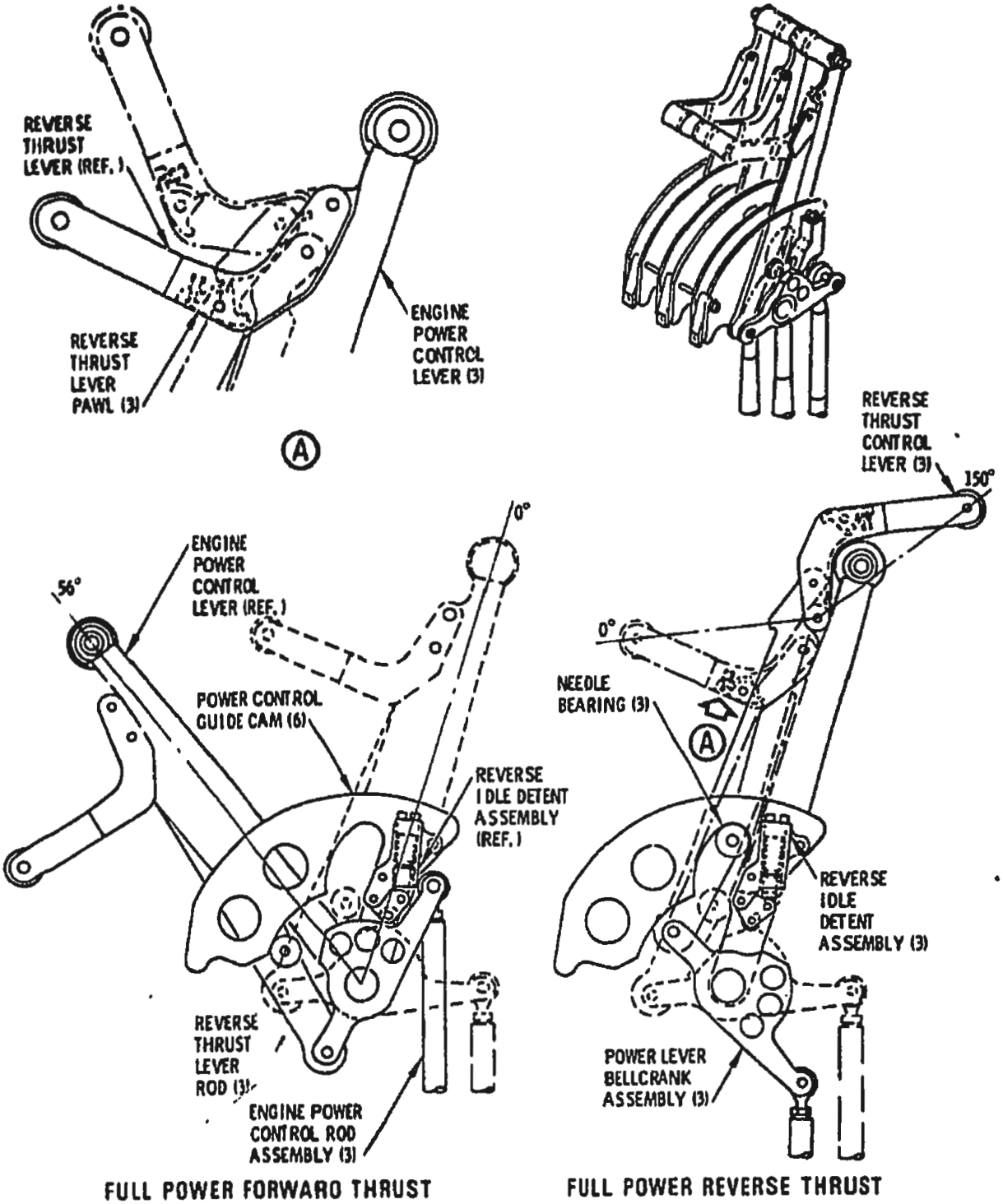
(2) In forward electronic service center, zone 112, remove drive shaft retainer from autothrottle clutch assembly (Ref. Fig. 503). Screw a 5-inch 3/8-24 bolt into end of clutch drive shaft, to be used as a handle, and extract drive shaft.

NOTE: If drive shaft sticks, move clutch outputs singly or in groups to facilitate removal.

(3) Manually move output quadrants to align clutches, then insert rig pin through left side wall of bracket, speed brake quadrant, clutches and throttle quadrant support lands within bracket (Ref. Fig. 503). (Do not use power control rods to move clutches.) If rig pin can be installed without moving power control levers and reverse thrust levers, the control lever to autothrottle clutch is correctly positioned and Steps (4) through (11) may be omitted.

(4) On center pedestal in flight station, zone 210, remove access panel from aft side of engine power control cover. Remove screws attaching engine power control cover to pedestal, and swing pedestal cover aft to expose engine power control rods. Exercise care to avoid overstressing switch wires attached to switches on cover.

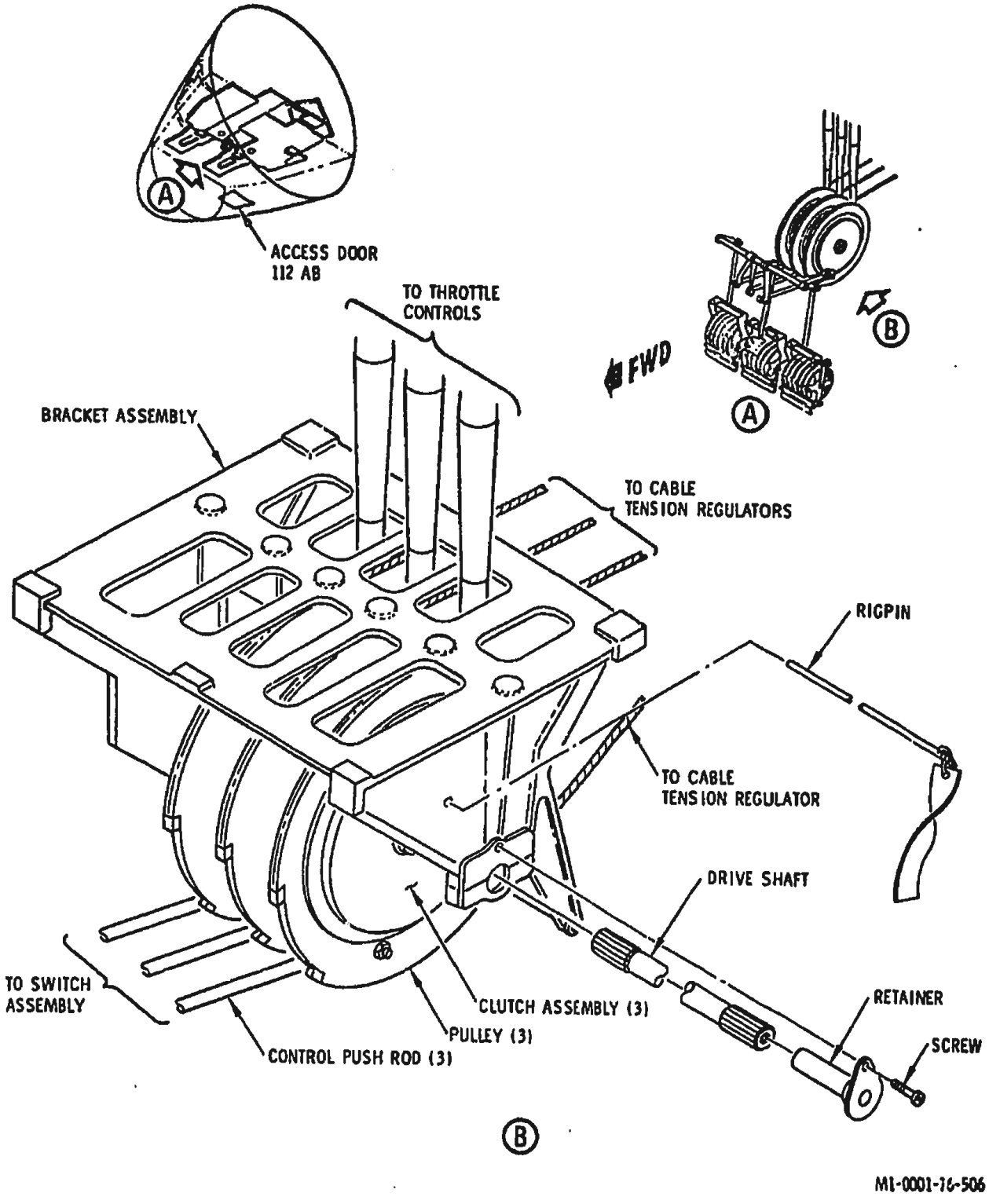
(5) Remove screw from engine power control rod bolt restraint, and rotate restraint away from bolt head.



HH 6045
M1-A01-76-004

Power Control Levers
Figure 502

R EFFECTIVITY: ALL
R
001B



Autothrottle Clutch Assembly Drive Shaft and Rig Pin
Figure 503

(6) Disconnect engine power control rod from engine power control lever.

NOTE: Access to rod attach bolts is improved if levers are rotated full forward.

(7) Manually move output quadrants to align clutches, then insert rig pin through left sidewall of bracket, speed brake quadrant, clutches and throttle quadrant support lands within bracket. (Do not use power control rods to move clutches.)

NOTE: Speed brake lever must be full forward and flap lever at 0 to insert rig pin.

(8) Adjust engine power control rod to minimum length that will allow installation of bolt without pulling engine power control lever off idle stop, and without bending rig pin.

(9) Connect rod to engine power control lever, then tighten and lock-wire adjustment locknut.

(10) Move bolt restraint into position over bolt head, and install screw.

(11) Replace engine power control cover while viewing wire harnesses through access hole, to assure harnesses do not foul equipment. Install access panel.

(12) Remove rig pin from clutch assembly. Do not use this rig pin for the remainder of this procedure.

(13) Move engine power control levers to midtravel position.

CAUTION: DO NOT FORCE DRIVE SHAFT INTO CLUTCH ASSEMBLY OR GEARBOX.

(14) Install drive shaft in autothrottle clutch assembly without trying to align throttle levers. Clutch outputs may be moved singly or in groups to achieve alignment for drive shaft installation. The three clutches must be moved together to gain entry into gearbox spline. Drive shaft rotation will lock internally when installed in gearbox.

(15) Remove 3/8-bolt from drive shaft.

(16) Install drive shaft retainer.

(17) If no further rigging is required perform rigging completion (Ref. Para. 5H).

C. Control System Switch Assembly Rigging

(1) Perform rigging preparation (Ref. Para. 5A).

(2) Place and tag engine power control levers in idle (0-degree) position. Secure levers against stops.

(3) Raise reverse thrust levers (approximately 50 degrees) and return to fully down (0-degree) position. Check that throttle switches protractor reading is between 42 and 43 degrees (Ref. Fig. 501). If the reading is correct, switch installation is rigged; Steps (4) through (6) may be omitted.

(4) Disconnect push rod from switch cam crank.

(5) Adjust length of push rod to allow bolt to be installed with a protractor reading between 42 and 43 degrees.

(6) Tighten and lock-wire adjustment locknut, and connect rod to switch cam crank. Recheck protractor reading.

(7) If no further rigging is required perform rigging completion (Ref. Para. 5H).

D. Cable Loop and Cable Tension Regulator Rigging

(1) Perform rigging preparation (Ref. Para. 5A).

(2) Ensure that all rig pins are removed from engine controls system.

(3) Raise applicable reverse thrust lever (approximately 50 degrees) then lower to fully down position and secure.

(4) Verify that engine power control lever and reverse thrust lever are tagged and in 0-degree position.

NOTE: Operating reverse thrust levers through this cycle puts operating load in power-advance cables. This compensates for cable stretch and lost motion.

(5) Adjust turnbuckles (Ref. Fig. 504) forward of tension regulator on engine No. 2, and in wing leading edge near pylons on engines No. 1 and 3, to obtain scale reading or pointer setting for tension regulator (Ref. Fig. 505). Cable turnbuckles in the forward electronic service center may also be adjusted if necessary.

NOTE: Uniform takeup in power-advance and power-retard cables increases the scale reading of the cable

tension regulator. Takeup in one cable and equal payout in mating cable will not change scale reading but rotates regulator quadrants which moves connected rods and rigging holes.

(6) Operate applicable engine power control lever, zone 210, and reverse thrust lever, in sequence, through several cycles.

(7) Raise reverse thrust levers (approximately 50 degrees) and return to fully down (0 degree) position.

(8) Secure engine power control lever and reverse thrust lever in the 0-degree position.

(9) Verify that tension regulator indicator setting complies with temperature-scale graph.

(10) While maintaining tension regulator indicator setting, take up tension in one cable and pay out an equal amount of tension in the other cable until the aircraft linkage rig pin can be installed (Ref. Fig. 506). Recheck tension regulator indicator setting. Do not remove aircraft linkage rig pin.

(11) Safety power-advance and power-retard cable turnbuckles.

CAUTION: DO NOT USE REVERSE THRUST BELLCRANK RIG PIN LOCATION.

(12) Install engine linkage rig pin (Ref. Fig. 506). If rig pin can be installed, Steps 13 through 15 can be omitted.

(13) Disconnect engine interface linkage control rod from applicable torque shaft or motion compensator assembly.

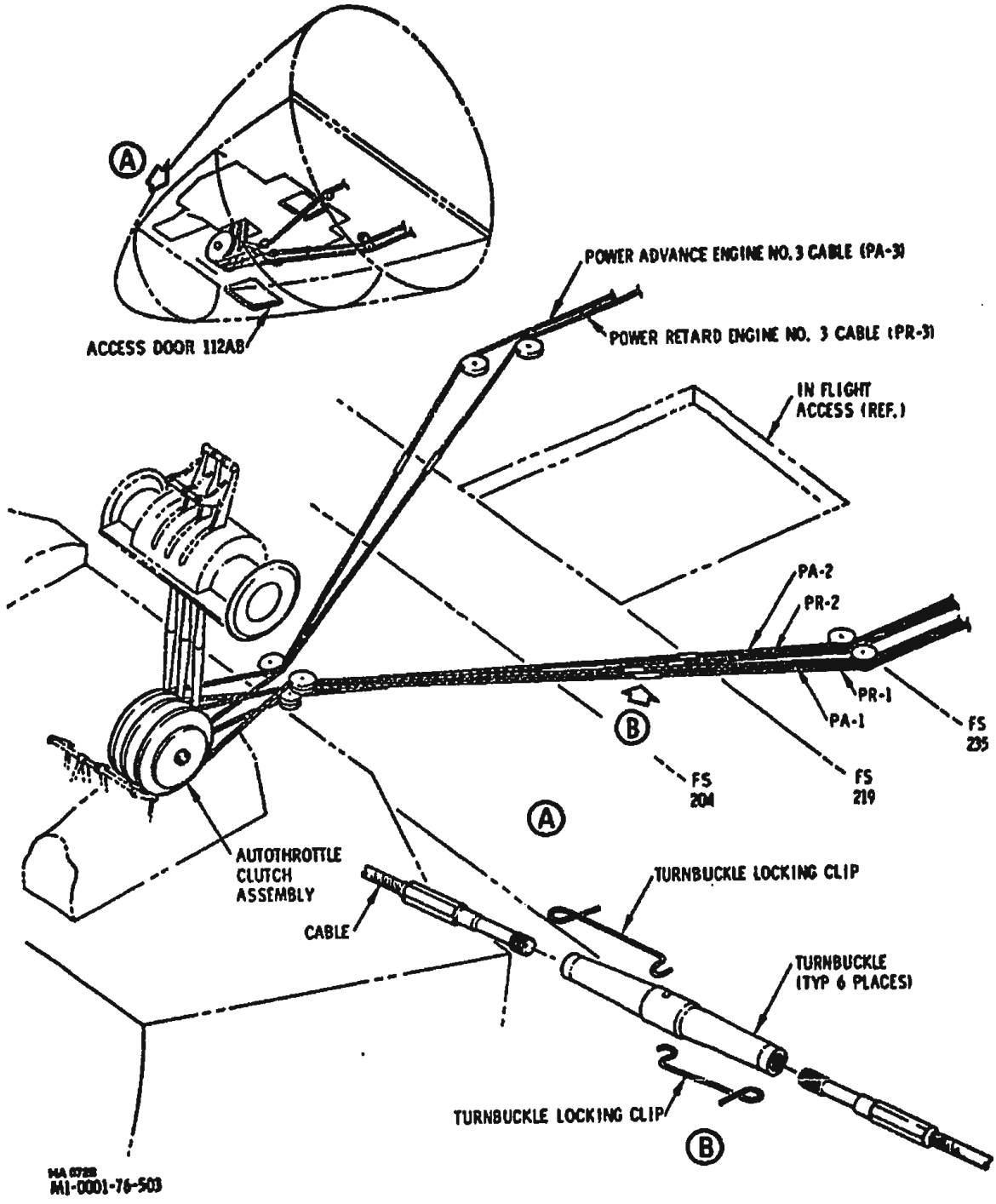
(14) Adjust the adjustable lever bellcrank eyebolt until bolt can be inserted easily to connect engine interface linkage rod to torque shaft or motion compensator.

(15) Connect engine interface linkage rod to torque shaft or motion compensator.

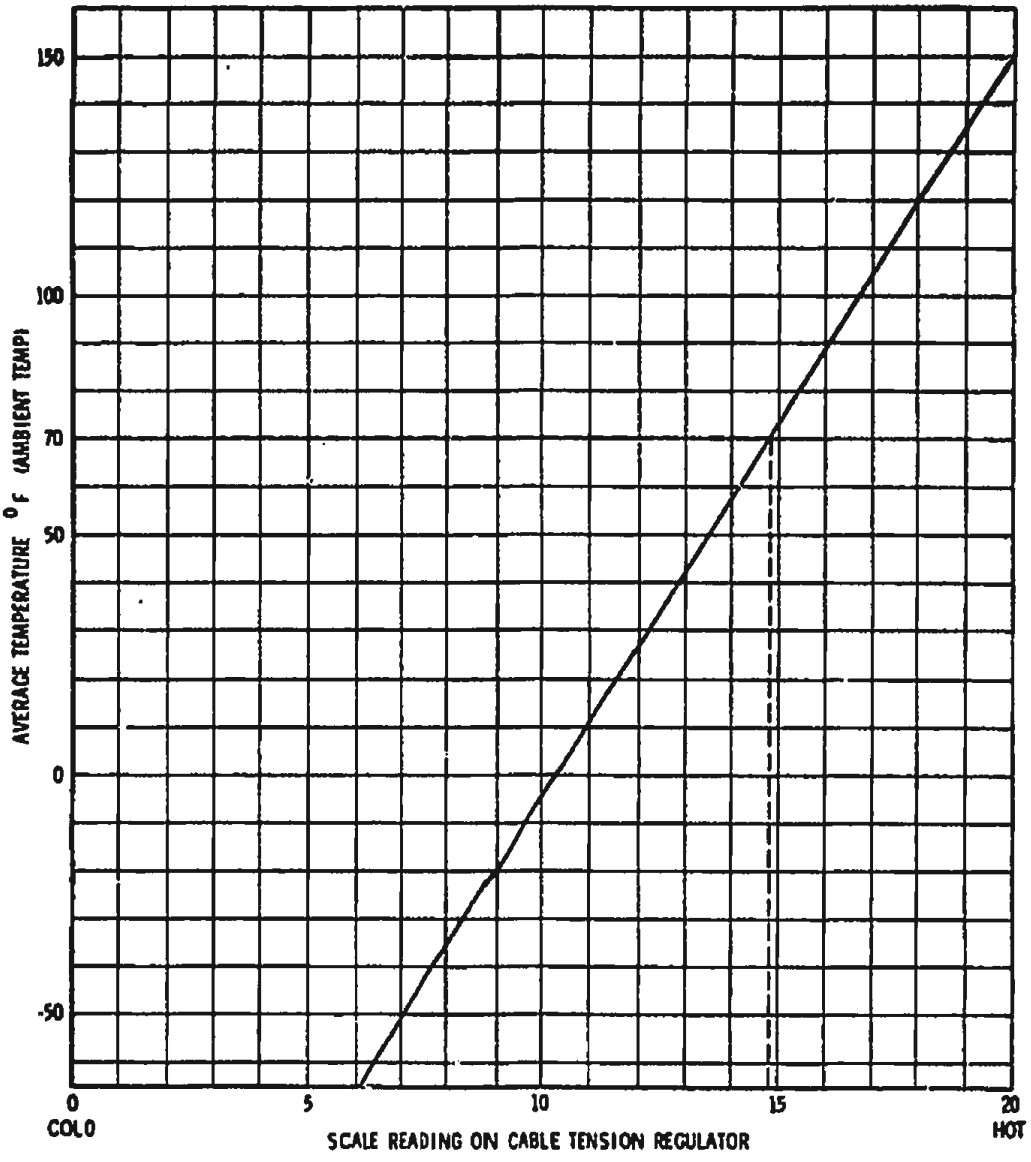
(16) Remove aircraft linkage rig pin.

R (17) Verify that rig pin can be installed in fuel flow
R regulator idle rig pin hole.

R (18) Remove engine linkage rig pin and fuel flow regulator
R rig pin.



R Turnbuckle Adjustment
R Figure 504

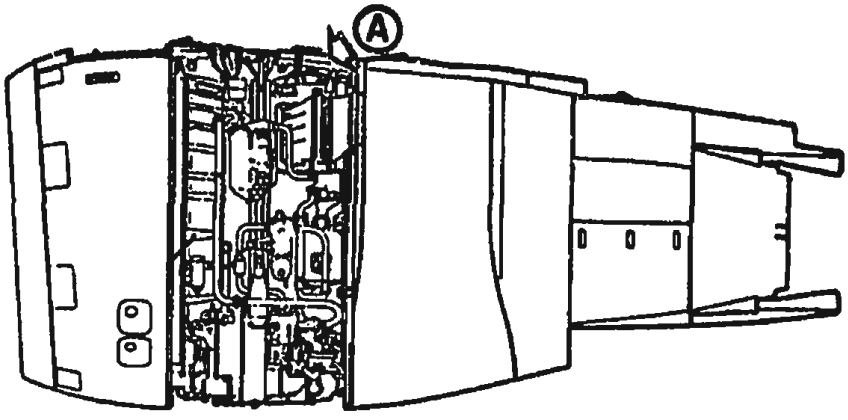


NOTE

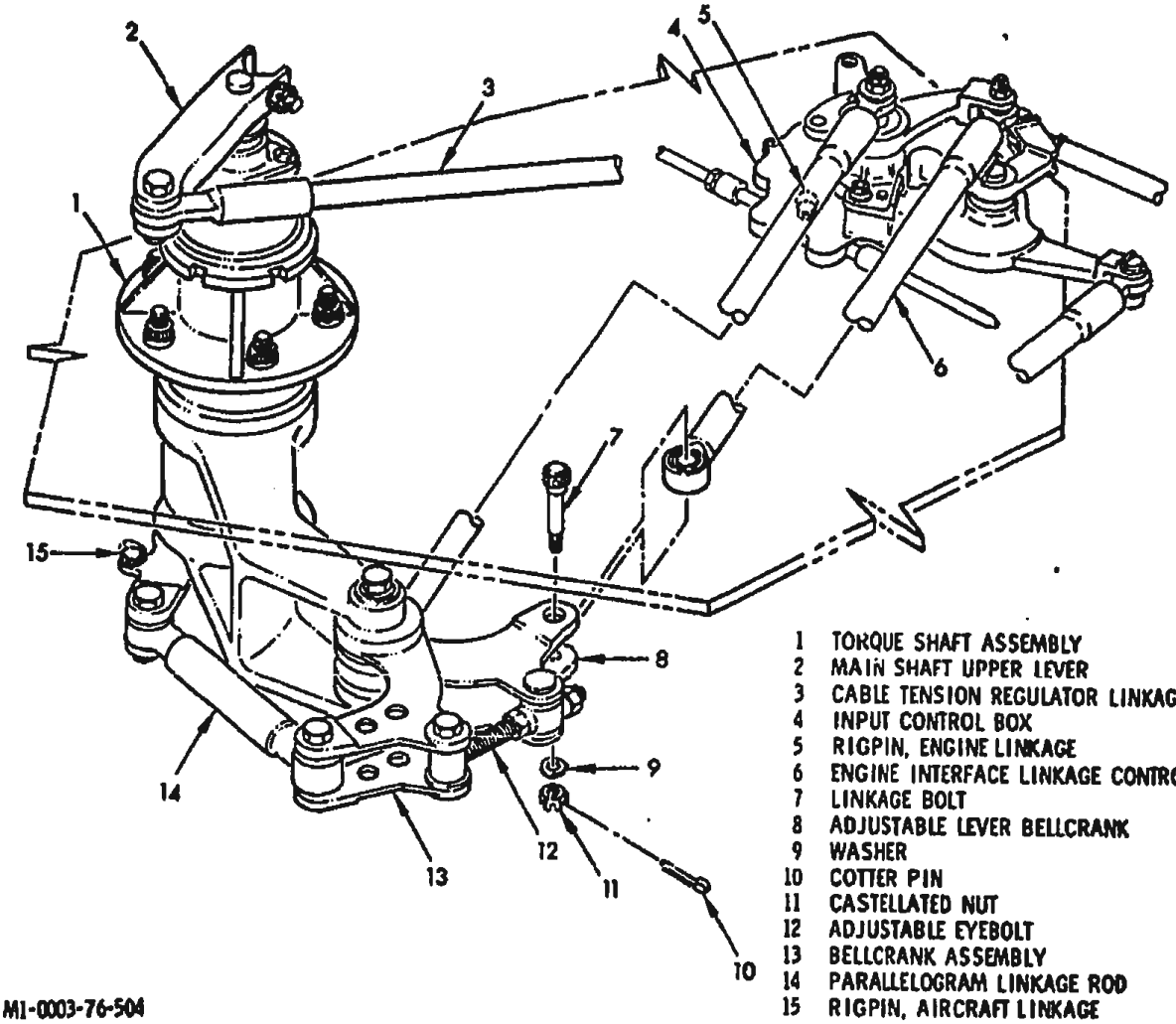
THE SCALE READING ADJUSTMENT FOR THE CABLE TENSION REGULATOR SHALL BE IN ACCORDANCE WITH VALUE ON THE GRAPH FOR THE EXISTING AVERAGE TEMPERATURE OF THE AIRPLANE AND WITHIN A TOLERANCE OF ±0.5 ON SCALE OF 20. THE GRAPH EXAMPLE SHOWS THAT FOR AVERAGE TEMPERATURE OF 70°F, THE CORRESPONDING SCALE READING IS 14.8.

M1-0100-76-502

Temperature-scale Graph
Figure 505



ZONE 410, 420

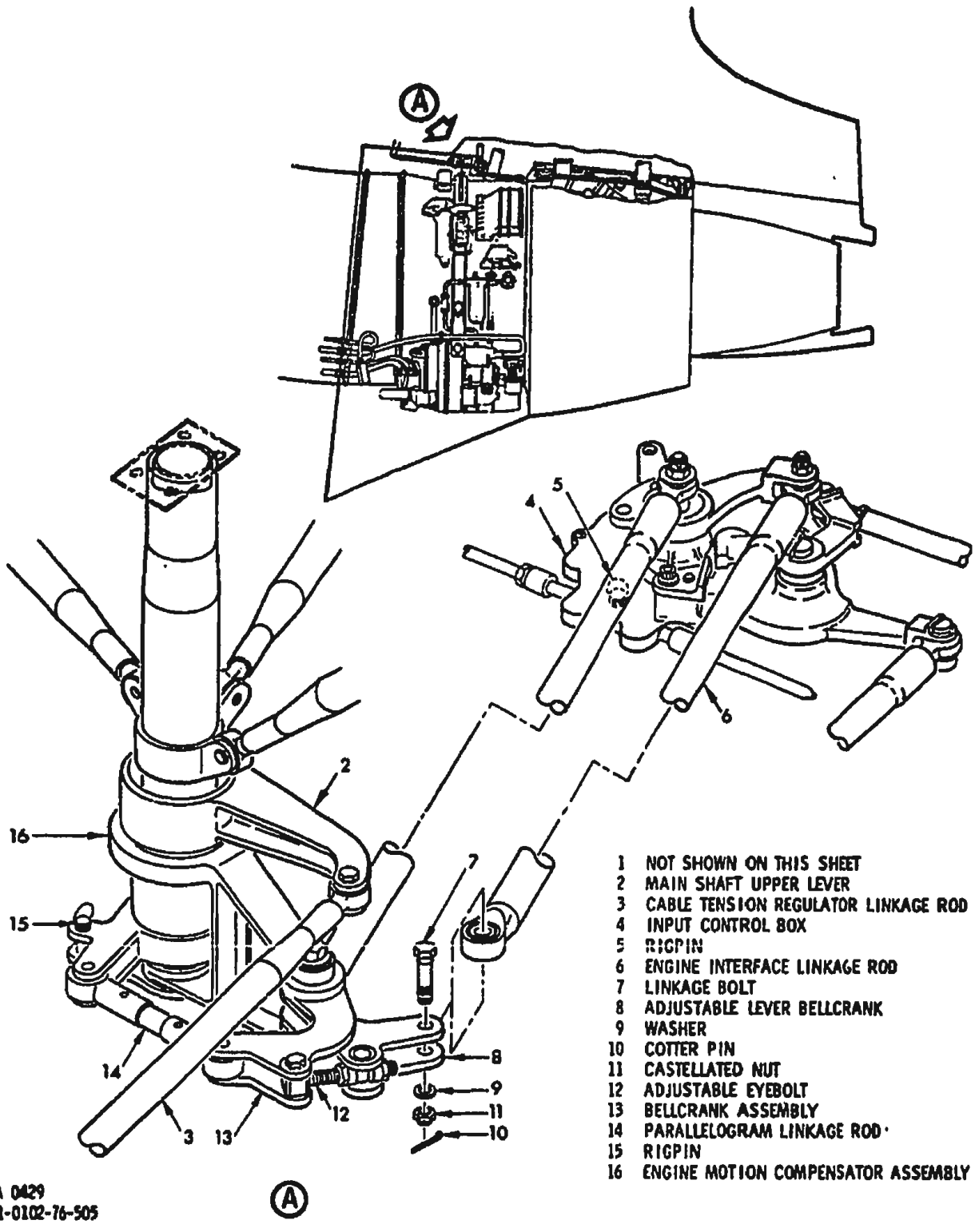


1 TORQUE SHAFT ASSEMBLY
2 MAIN SHAFT UPPER LEVER
3 CABLE TENSION REGULATOR LINKAGE ROD
4 INPUT CONTROL BOX
5 RIGPIN, ENGINE LINKAGE
6 ENGINE INTERFACE LINKAGE CONTROL ROD
7 LINKAGE BOLT
8 ADJUSTABLE LEVER BELLCRANK
9 WASHER
10 COTTER PIN
11 CASTELLATED NUT
12 ADJUSTABLE EYEBOLT
13 BELLCRANK ASSEMBLY
14 PARALLELOGRAM LINKAGE ROD
15 RIGPIN, AIRCRAFT LINKAGE

MI-0003-76-504

R Engine Linkage Disconnects
R Figure 506 (Sheet 1)

EFFECTIVITY: ALL



Engine Linkage Disconnects
Figure 506 (Sheet 2)

NOTE: If the thrust reverser system requires rigging, refer to 78-30-00, Adjustment and Test.

(19) Remove tags and release engine power control lever and reverse thrust lever.

(20) Perform rigging static check (Ref. Para. 4).

(21) If no further rigging is required perform rigging completion (Ref. Para. 5H).

E. Thrust Reverser Selector Valve Linkage Rigging

(1) Perform rigging preparation (Ref. Para. 5A) if required.

(2) Disconnect control rod from thrust reverser selector valve actuating link (Ref. Fig. 507).

(3) Move applicable engine power control lever, zone 210, until rig pin holes in mixing mechanism assembly gear sector and support plate align, then install engine linkage rig pin UT.993.

(4) Manually withdraw selector valve actuating link to forward thrust position (fully extended).

NOTE: A magnetic lock within selector valve will hold actuating link in fully extended position.

(5) On engines without RR SB76-3201, release locknut on control rod (2); while applying a rearwards load to control rod adjust length of rod until bolt (1) is an easy fit in actuating link (3) and control rod (2).

(5) On engines with RR SB76-3201, release locknut and fit a new key washer to control rod (2). While applying a rearwards load to control rod adjust length of rod until bolt (1) is an easy fit in actuating link (3) and control rod (2).

(6) Remove bolt and rod from selector valve actuating link, and shorten length of control rod by one and one-half turns. Tighten control rod locknut.

(7) On engines without RR SB76-3201, connect control rod (2) to actuating link (3), tighten control rod locknut, and verify that rod end threads are visible through the inspection hole in control rod.

(7) On engines with RR SB76-3201, connect control rod (2) to actuating link (3), tighten locknut on control rod (2) then lock locknut by bending small tabs on key washer up to locknut and large tab down on flat of control rod furthest from locknut tabs. Check that rod end threads can be seen or felt through inspection hole in control rod.

(8) Remove rig pin UT.993.

(9) If no further rigging is required perform rigging completion (Ref. Para. 5H).

F. Thrust Reverser Feedback Linkage Rigging

(1) Perform rigging preparation (Ref. Para. 5A) if required.

(2) On engines with RR SB76-2207 (Ref. Fig. 507), remove bolt, washer, nut, and cotter pin (11) securing feedback link to relay link.

(2) On engines with RR SB76-2675, remove bolt washer, nut, and cotter pin (12) securing feedback link to relay link.

(2) On engines without RR SB76-2675, remove bolt, nut, and cotter pin (13).

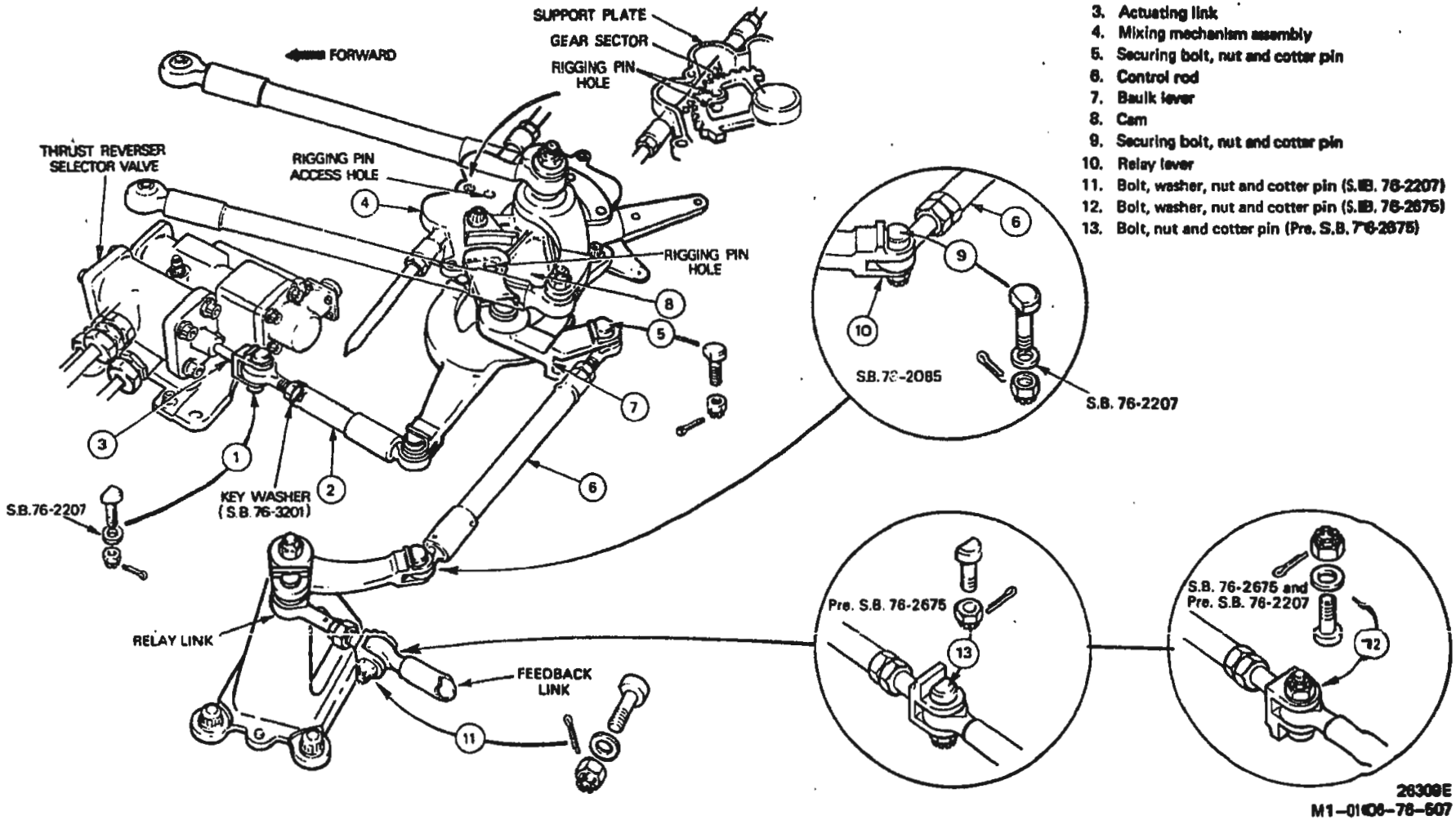
(3) Ensure thrust reverser is in forward thrust position then set thrust reverser feedback link (Ref. 78-30-00).

(4) On engines without RR SB76-2675, engines with RR SB76-2085 (Engine Controls - Introduction of thrust reverser feedback control rod with improved adjustment), disconnect control rod from relay lever.

(4) On engines without RR SB76-2085, disconnect control rod from baulk lever (Ref. Fig. 507).

(5) On engines with RR SB76-2207, connect feedback link to relay link and secure with bolt, nut, washer, and new cotter pin (11).

(5) On engines with RR SB76-2675, connect feedback link to relay link and secure with bolt, nut, washer, and new cotter pin (12).



Thrust Reverser Selector Valve Linkage
Figure 507

(5) On engines without RR SB76-2675, connect feedback link to relay link and secure with bolt, nut, and new cotter pin (13).

(6) Move engine power control lever, zone 210, until rigging pin holes in mixing mechanism assembly (4) gear sector and support plate align.

(7) Install engine linkage rig pin UT.993 (Ref. Fig. 507).

(8) On engines with RR SB76-2141 move baulk lever to align rig pin holes in debris guard, lever, and cam, then install engine linkage rig pin.

(8) On engine without RR SB76-2141,move baulk lever to align rig pin holes in lever and cam, then install engine linkage rig pin.

C NOTE: When aligning the rig pin holes there will
C usually be a total of 4 holes. Two styles of
C levers exist. One style has 4 holes of the same
C diameter in which case the pin will pass through
C all four holes. The second style has one hole,
C (third from the top) that is a smaller diameter,
C in which case alignment is performed by using
C only the top two holes for the rig pin.

(9) On engines with RR SB76-2085, release locknut on control rod and adjust length of rod until attachment bolt can be inserted freely in relay lever and control rod. Connect control rod to relay lever.

(9) On engines without RR SB76-2085, release locknut on control rod and adjust length of rod until attachment bolt can be inserted freely in baulk lever and control rod. Connect control rod to baulk lever.

(10) Tighten control rod lock nut and verify that rod end threads are visible through the inspection hole.

(11) Remove rig pins.

(12) Verify that electrical power is turned off (Ref. 24-41-00).

(13) On pilots overhead circuit breaker panel CB1, zone 210, ensure that the applicable circuit breaker THRUST REVERSE (H16, H17, or H18) is open.

(14) Move reverse thrust lever to reverse idle position and check that further rearward movement is prevented by baulk mechanism, then return lever to forward idle position.

(15) Close thrust reverse circuit breaker.

(16) Operate thrust reverser to reverse thrust position (Ref. 78-30-00).

(17) Open THRUST REVERSE circuit breaker.

(18) Move reverse thrust lever to forward idle position and check that forward movement of engine power control lever is prevented by baulk mechanism, then return reverse thrust lever to reverse idle position.

(19) Close THRUST REVERSE circuit breaker.

(20) Operate thrust reverser to forward thrust position (Ref. 78-30-00).

(21) If no further rigging is required, perform rigging completion (Ref. Para. 5H).

G. Engine Power Linkage Rigging

(1) Perform rigging preparation (Ref. Para. 5A) if required.

(2) Move applicable engine power control lever, zone 210, to align rig pin holes in input control box gear sector and support plate, then install engine linkage rig pin UT.993 (Ref. Fig. 507).

(3) Loosen securing clips (Ref. Fig. 508).

(4) Disconnect connecting link from air throttle lever and output lever (Ref. Fig. 509).

(5) Move the air throttle lever to align rig pin slot in lever and rig pin hole in throttle case, then install air throttle lever rig pin UT.1150/1.

(6) Loosen clamp assembly bolts. Using spring scale, connected at bolt hole in fuel flow regulator box output lever, apply a load of 2 to 3 lb force (8.896 to 13.344N) in direction of air throttle lever.

(7) On engines without RR SB76-5034, hold body of micro adjuster and rotate connector until rig pin holes in fuel flow regulator box case and gear

sector align, then install engine linkage rig pin UT.993.

(7) On engines with RR SB76-5034, release locknut (14), hold body of micro adjuster and rotate connector until rig pin holes in fuel flow regulator box case and gear sector align, install engine linkage rig pin UT.993.

(8) Remove applied load.

(9) Remove engine linkage rig pin installed in Step (7).

(10) Tighten securing clips.

(11) Using spring scale, apply a load of 2 to 3 lb force (8.896 to 13.344N) at center of bolt hole in output lever in direction of air throttle lever.

(12) Verify that rig pin holes in fuel flow regulator box case and gear sector align, then install engine linkage rig pin UT.993.

NOTE: If rig pin holes do not align, hold body of micro adjuster and rotate connector until rig pin can be inserted freely.

(13) Remove applied load.

(14) On engines with RR SB76-5034, torque tighten locknut (14), to a value of 35 to 45 lb. in. (3.959 to 5.090 Nm), then lock-wire.

(15) Torque tighten clamp assembly bolts to a value of 25 to 32 lb in. (2.8-3.6Nm), then lock-wire.

(16) On engines without RR SB76-3770, adjust connecting link as follows:

(a) Release locknut (11) and timing washer (12) on connecting link (3). Adjust link ends until they line up with each other at centering mark on rod end (13) as shown in Fig. 509, View A. Ensure angular relationship between connecting link ends is as shown in Fig. 509, View B.

(b) Fit connecting link (3) to output lever (5) and secure with bolt, washer, nut, and new cotter pin (2).

CAUTION: THE 'MESSERSCHMITT' ADJUSTER ON THE FUEL FLOW REGULATOR AIR THROTTLE LEVER IS RIG SET DURING F.F.R. BUILD, TO GIVE THE CORRECT ANGULAR RELATIONSHIP BETWEEN THE LEVER AND THE THROTTLE INPUT SHAFT AND MUST NOT BE USED TO EFFECT CONTROL SETTING, (REF. FIG. 509).

(c) Adjust length of connecting link (3) by rotating rod end (13) only, until bolt (1) can be easily inserted in air throttle lever (4) and connecting link. Ensure connecting link ends angular relationship achieved in Step (a) is not disturbed.

CAUTION: ENSURE BOLT (1) IS FITTED WITH BOLT HEAD NEAREST F.F.R. (REF. FIG. 509). FAILURE TO FIT BOLT CORRECTLY CAN RESULT IN A FOUL CAUSING RESTRICTED MOVEMENT OF ENGINE POWER CONTROL LINKAGE.

(d) Secure connecting link (3) to air throttle lever (4) with bolt, washer, and nut. Torque tighten nut to 75 lb in. (8.47 Nm) and lock with new cotter pin.

NOTE: If after torque tightening the nut castellations do not line up with the hole in the bolt, continue tightening the nut until cotter pin can be installed.

(e) Hold rod end (13) to prevent it from turning, and secure locknut (11) and timing washer (12).

(f) Check that connecting link (3) has rotational movement on bearings.

(16) On engines with RR SB76-3770, adjust connecting link as follows:

(a) Release locknut (11) on connecting link (3) and slide timing washer (12) away from connecting link then remove rod end (13), locknut and timing washer from connecting link (Ref. Fig. 509).

WARNING: WHEN USING DEGREASING FLUID, ENSURE ADEQUATE VENTILATION AND AVOID SKIN CONTACT AND INHALING THE VAPOR.

(b) Cold liquid degrease mating threads of connecting link (3), rod end (13) and locknut (11), and allow to dry.

(c) Brush apply a thin coat of dry film lubricant to mating threads of connecting link (3), rod end (13) and locknut (11).

(d) While lubricant is still wet, loosely assemble timing washer (12), locknut (11) and rod end (13) to connecting link (3).

CAUTION: ENSURE BOLT IS FITTED WITH BOLT HEAD NEAREST F.F.R. FAILURE TO FIT BOLT CORRECTLY CAN RESULT IN A FOUL CAUSING RESTRICTED MOVEMENT OF ENGINE POWER CONTROL LINKAGE.

(e) Fit connecting link (3) to air throttle lever (4) and secure with bolt, washer and nut (1). Torque tighten nut (Ref. 70-51-00) and lock with new cotter pin. If after torque tightening the castellations do not line up with the hole in the bolt continue torque tightening until hole is visible.

CAUTION: THE 'MESSERSCHMITT' ADJUSTER ON THE FUEL FLOW REGULATOR AIR THROTTLE LEVER IS RIG SET DURING F.F.R BUILD, TO GIVE THE CORRECT RELATIONSHIP BETWEEN THE LEVER AND THE THROTTLE INPUT SHAFT AND MUST NOT BE USED TO EFFECT CONTROL SETTING.

(f) Adjust length of connecting link (3) by screwing rod end (13) in or out, until bolt (2) can be easily inserted in output lever (5) and link.

(g) Slide timing washer (12) up to connecting link (3) ensuring positive engagement of locking features on timing washer within grooves on link then secure locknut (11).

(h) Secure connecting link (3) to output lever (5) with bolt, washer, and nut (2). Torque tighten nut (Ref. 70-51-00) and lock with new cotter pin. If after tightening the castellations do not line up with the hole in the bolt continue torque tightening until hole is visible.

(17) Remove rigging pins UT.993 and UT.1150/1. Remove rigging pin UT.993 fitted in Step 5G(2).

R (18) On engines without RR SB76-8300,
R check the number of exposed threads on the rod end (13) does not exceed 15 threads, if more than 15 threads are exposed change the Fuel Flow Regulator Box.

R (18) On engines with RR SB76-8300,
R check that rod end threads (13) can be seen or felt
R through inspection hole in connecting link (3), if no
R threads can be seen or felt change the Fuel Flow
R Regulator Box.

(19) Check controls for correct locking, security, freedom and full range of movement (Ref. 76-11-02).

(20) Perform rigging static check (Ref. Para. 4).

(21) If no further rigging is required perform rigging completion check (Ref. Para. 5H).

H. Rigging Completion

(1) Remove mechanical locks installed in Step 5A(5).

(2) Install or close cowl, as applicable.

(3) Remove tags installed in Steps 5A(2) and (3).

(4) Remove tags and close circuit breakers opened in Step 5A(1).

6. Engine Power Control Lever Alignment

NOTE: The following engine power control lever alignment procedures are applicable to any engine. If more than one engine is to be checked/aligned, repeat the instructions for subsequent engines.

A. FFR Throttle Box Check

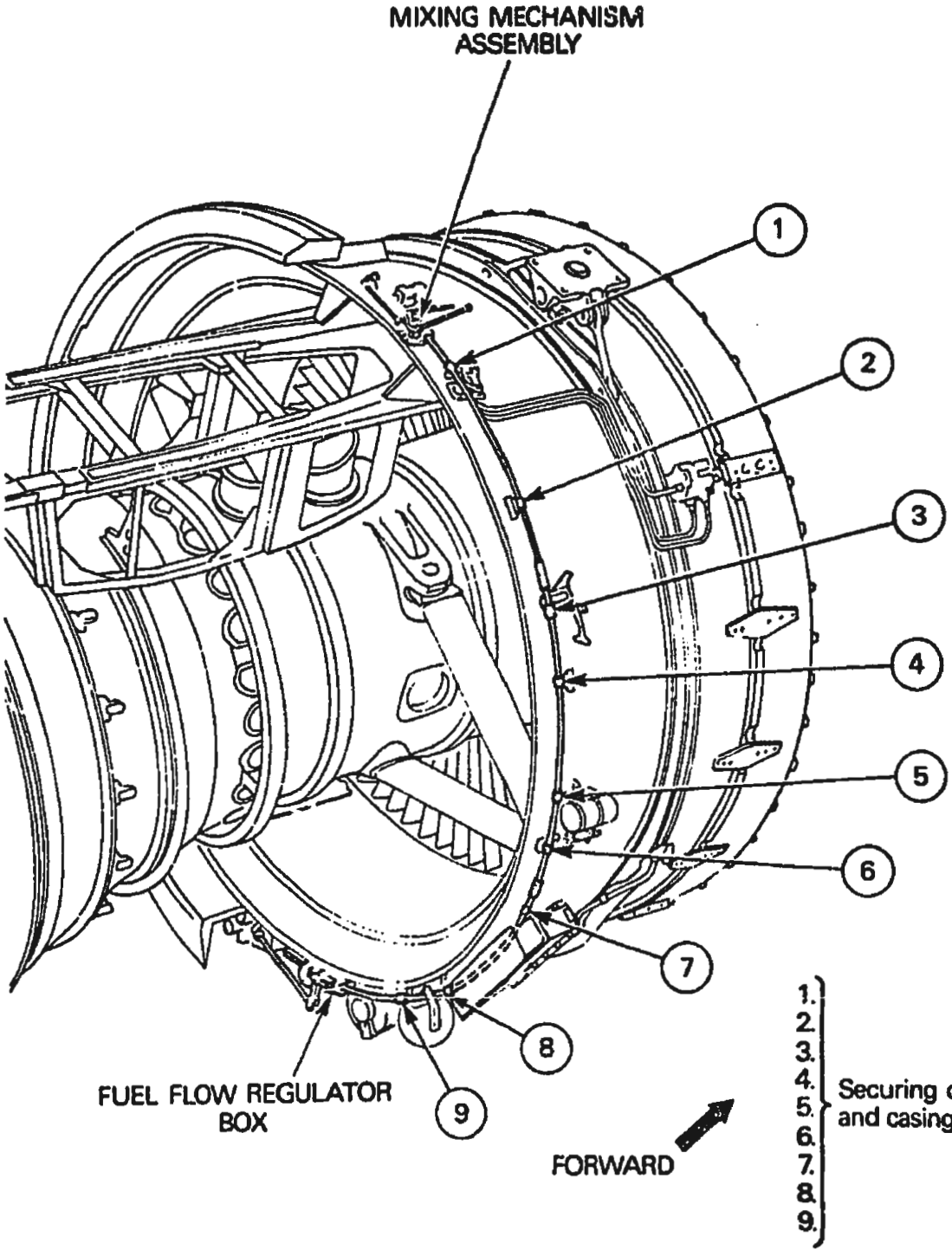
(1) Open left hand hinged cowl 413A or 423A and right hand hinged cowl 414A or 424A for engines No. 1 and 3, (Ref. 71-11-00) or 433AL and 434AR (Ref. 71-12-01) and 433DL and 434DR (Ref. 71-12-05) for engine No. 2.

(2) Inspect fuel flow regulator box as follows:

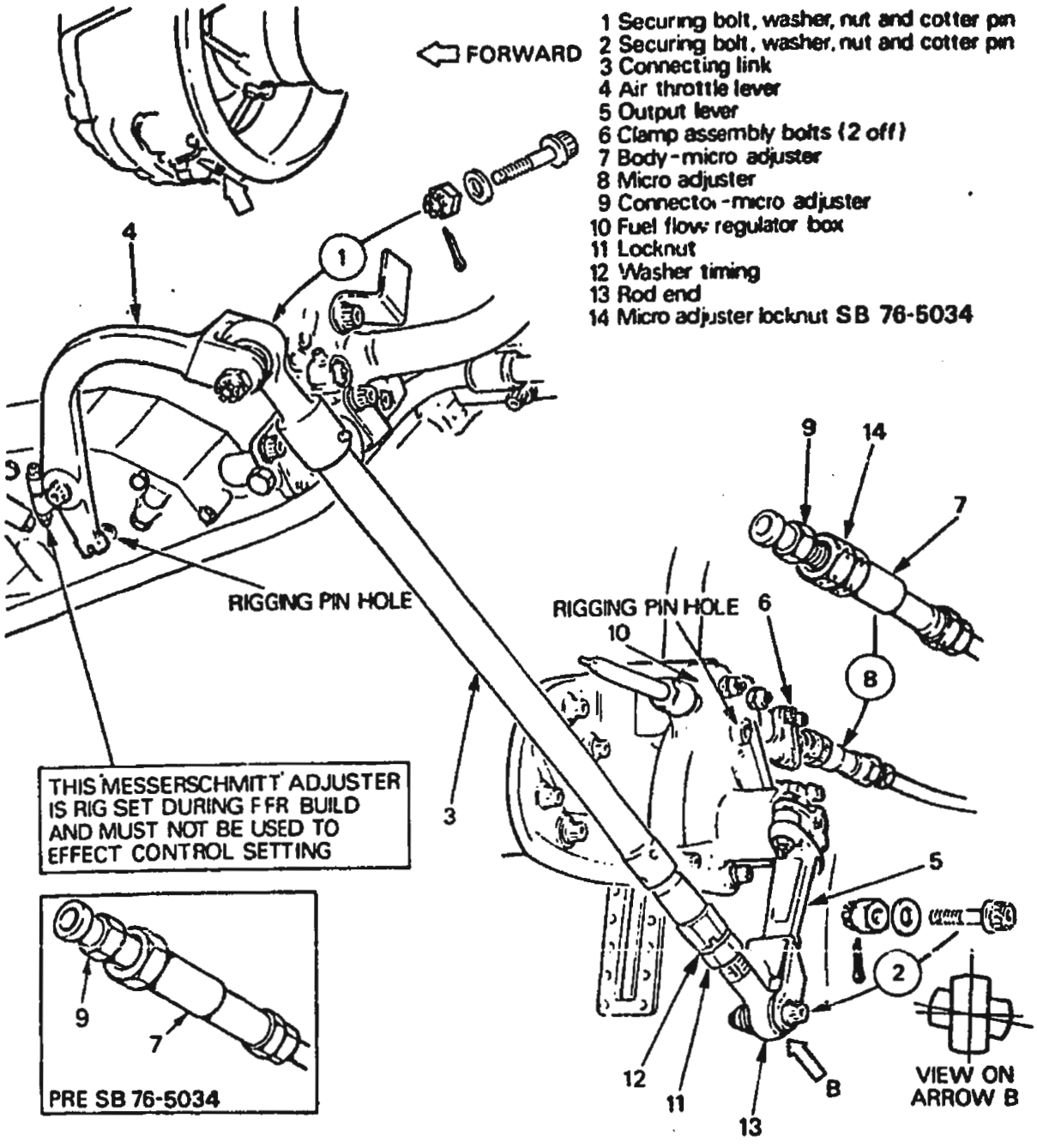
(a) On pilots center console, tag applicable APU/GRD AIR TO REVERSERS switch.

(b) On pilots overhead circuit breaker panel CB1, open and tag applicable circuit breaker THRUST REVERSE (H16, H17 or H18).

On Flight Engineer/Second Officers aft circuit breaker panel CB3, open and tag applicable circuit breaker START AIR VALVE (N3, N9 or N15).



Linkage Securing Clips
Figure 508


FORWARD
1 Securing bolt, washer, nut and cotter pin
2 Securing bolt, washer, nut and cotter pin
3 Connecting link
4 Air throttle lever
5 Output lever
6 Clamp assembly bolts (2 off)
7 Body-micro adjuster
8 Micro adjuster
9 Connector-micro adjuster
10 Fuel flow regulator box
11 Locknut
12 Washer timing
13 Rod end
14 Micro adjuster locknut SB 76-5034
RIGGING PIN HOLE
RIGGING PIN HOLE
THIS MESSERSCHMITT ADJUSTER IS RIG SET DURING FFR BUILD AND MUST NOT BE USED TO EFFECT CONTROL SETTING
PRE SB 76-5034
VIEW ON ARROW B
90455
M1-0004-78-509

Engine Power Linkage
Figure 509

R EFFECTIVITY: ALL
R
001B

(c) On pilots overhead panel, tag applicable ENGINE START panel switch lights.

C (d) Visually check the cableclamp on lower teleflex
C torque box insuring no relative motion or
C looseness exists between the teleflex torque box,
C clamp assembly Mfg. P/N 27210-1 (Stk. Nbr.
C 61-6914), the micro adjust body, Mfg. P/N 27243-1
C (Stk. Nbr. 61-7323) and the micro adjust
C connector, Mfg. P/N 27222-1 (Stk. Nbr 61-7322).
C If looseness due to wear exists, replace the
C part(s) required to stop all relative
C motion/looseness. This connection must be a solid
C one-piece assembly when assembled to preclude any
C throttle binding.

C (e) Remove cable clamp from lower teleflex torque box.

C (f) Disconnect the FFR throttle rod (link) at torque
C box.

C (g) Break safety and remove connector Mfg. P/N 27217-1
C (Stk. Nbr. 61-6905) on throttle box.

C (h) Move lever to expose nitrided section of rack and
C dove tail.

C (i) Inspect the dovetail joint between inner cable and
C rack.

C NOTE: If wear exists, inspect dovetail joint by
C placing an axial tension load on joint,
C then by use of feeler gauge, insure that
C axial clearance in joint does not exceed
C .014 of an inch.

C (j) Visually inspect rack particularly in the cruise
C to T.O. power position. Tooth wear shall not
C exceed 25% of tooth thickness.

C (k) If parts inspected above are serviceable,
C re-install and lock-wire connector fitting, then
C reconnect controls.

C (l) If parts inspected above are not serviceable,
C replace fuel flow regulator box or control cable
C as applicable.

(m) On control boxes with Teleflex SB42319-73-1 (RR MOD SB76-3091) (identifiable by Type No. 27201-6 or -7),
check that the dovetail end fitting on the rack is

not loose. If dovetail is loose, reject control box.

(3) On engines without RR SB72-2892 (control rod with improved end fittings), perform following on the control rod from the lower control box to the FFR:

(a) Verify that the taper pins securing the end fittings are not loose.

(b) Verify that the taper pin holes are not elongated and that there is no cracking in the area of the taper pin holes.

NOTE: If any of these defects are present, reject rod.

B. Aircraft Power Linkage Rigging Check

(1) Set engine power control lever against idle stop.

(2) Raise reverse thrust control lever (approximately 50 degrees), then lower to fully down position.

(3) Install rig pin into Eng. No. 2 motion compensator or Eng. No. 1 or 3 Torque shaft assembly (Ref. Fig. 506). If pin installs easily, the aircraft section of the system is rigged. Remove rig pin.

NOTE: If rig pin does not install easily, refer to paragraphs 5.A, B, C, and D for rigging and adjustment procedure.

C. Engine Power Linkage Rigging Check

(1) Install rig pin at control gearbox at top of engine (Ref. Fig. 507).

(2) Apply a load of 2 to 3 lbs (8.896 to 13.344N) force to FFR box output lever in the direction of the FFR air throttle lever.

(3) Verify that rig pin holes line up in control box (Ref. Fig. 509).

(4) Verify that rig pin holes line up in FFR, then remove rig pins.

NOTE: If rig pin holes do not line up, it will be necessary to check engine linkage rigging (Ref. Paragraph 5.G).

(5) Move the engine power control lever forward gradually, and check to ensure that the FFR air throttle lever hits the max stop before the engine power control lever hits the pedestal stop.

D. FFR Cam Follower Friction Check

(1) Friction of the cam follower roller in the cam follower assembly can be the cause of engine power control lever stiffness. Check for freedom of movement and correct as required per the following:

(a) Remove the bolt and nut that attaches the FFR-to-throttle box link at the FFR lever.

(b) Rotate the lever from the idle detent to both the forward and reverse thrust direction several times. If any unusual binding or friction is encountered, clean FFR air throttle valve (Ref. 73-21-01).

(c) Reinstall the FFR-to-throttle box link removed in Step (a) above.

E. Replace P4 filter in the fuel flow regulator (Ref. 73-21-01).

F. Check installation and safety of connectors, cover and support clips.

G. Close the engine cowling and reset circuit breakers opened in Paragraph A. above.

NOTE: Paragraphs H, I, and J, requiring engine run, are optional procedures which may be performed at airline discretion.

H. Engine Trim

(1) After completion of the instructions outlined in Paragraphs A through G above, prepare to perform engine trimming tests/adjustments in accordance with the following:

NOTE: The following engine trim tests/adjustment procedure is based upon use of aircraft instrumentation. IEPR system accuracy must be within tolerance specified in 71-00-00.

(a) Start the engine (Ref. 71-00-00).

(b) Perform TEST 3 Ground Idle/Flight Test and adjust ground idle if required (Ref. 71-00-00).

NOTE: During above ground idle/flight idle checks/adjustment, two (2) packs are to be on.

R # CENTER CONSOLE PEDESTAL - REMOVAL AND INSTALLATION

R 1. Equipment and Materials

R Rig Pin, 5/16 inch diameter; 3 inches long (R3)

R Protective Pad, Foam rubber 1 by 2 feet

R Plastic protective caps

R 2. Referenced Procedures

R	24-41-00	External Power/Ground Service Systems - Maintenance Practices
R	25-13-05	Center Console Trim Covers - Removal and Installation
R	27-11-04	Roll Disconnect Handle - Removal and Installation
R	27-41-35	Pitch Disconnect Handle - Removal and Installation
R	27-42-00	Horizontal Stabilizer Trim Control Systems - Adjustment and Test
R	27-51-00	Flap Control System - Adjustment and Test
R	27-61-01	Speedbrake Control Lever - Removal and Installation
R	29-11-00	Hydraulic Power System - Maintenance Practices
R	31-22-05	Speedbrake Control Lever Unsafe Takeoff Aural Warning Switch - Removal and Installation
R	32-48-03	Parking Brake Cable Assembly - Removal and Installation
R	76-11-00	Engine Control System - Adjustment and Test

R 3. Removal and Installation

R A. Removal

R WARNING: VERIFY ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF. ENSURE FE/SO HYDRAULIC SYSTEM PANEL, ZONE 215, AND HYDRAULIC SERVICE PANEL, ZONE 147, ARE TAGGED.

R (1) Depressurize all four hydraulic systems and tag FE/SO Hydraulic System Panel, Zone 215, and Hydraulic Service Panel, Zone 147 (Ref. 29-11-00).

R (2) On Pilots overhead circuit breaker panel CB1, Zone 210, open and tag the following circuit breakers:

R (a) AUTO THROTTLE SERVO (A1)

R (b) SPEED CONT (A2)

R (c) FCES - COMPUTERS - AC&L - AOA (B5)

R (d) THRUST REVERSE (H16, H17, H18)

R (e) NO. 2 ASYM BK LE SLAT (J10)

R (f) NO. 2 ASYM BK TE FLAP (J11)

R (g) LANDING GEAR WARN HORN (L12)

R (3) On FE/SO Overhead circuit breaker panel CB2, Zone 215, open and tag the following circuit breakers:

R (a) R AOA (F1)

R (b) T/O AURAL WARNING (H7)

R (c) DLC SERVO A and B (H14 and H15)

R (d) No. 1 ASYM BRAKE - TE FLAP (H21)

R (e) NO. 1 ASYM BRAKE - LE SLAT (H22)

R (f) THROT STAND (M5)

R (4) On FE/SO aft circuit breaker panel CB3, Zone 215, open and tag circuit breaker START AIR VALVE (N3, N9, N15).

R (5) On Pilots center console, Zone 210, tag APU/GND AIR TO REVERSER toggle switches.

R (6) On Pilots overhead panel, Zone 210, tag ENGINE START panel.

R (7) Remove left and right center console trim panels (Ref. 25-13-05) and [Ref. Fig. 401 (Sheet 1)].

R (8) Loosen setscrews and remove knobs from CTR CONSOLE ENGINE INSTR panel [Ref. Fig. 401 (Sheet 2)].

(9) Remove screws and CTR CONSOLE ENGINE INSTR panel from pedestal.

(10) Remove screws and edge lighted panel from pedestal.

R (11) Move flap handle, speedbrake lever and engine power
R control levers full forward.

(12) Remove screws from throttle stand cover. Remove cover by rotating up and rearwards, taking care not to damage lever seals. Pull sufficient throttle cover wire harness out of trough in throttle stand and rest cover on center console using pad to protect throttle cover [Ref. Fig. 401 (Sheet 1)].

(13) Position trim wheel to 4 degrees. Gain access to FESC through access door 112AB. Install rig pin (R3) in bracket and forward pitch trim cable drum beneath flight station floor (Ref. 27-11-04) and [Ref. Fig. 401 (Sheet 1)].

(14) Disconnect vertical push rods from pedestal controls as follows (Ref. Fig. 402):

(a) Remove cotter pins, nut, washer and bolt from flap push rod at flap handle.

(b) Remove cotter pin, nut, washer, bolt and spacers from throttle push rods at throttle bellcranks.

(c) Remove cotter pin, nut, washers and bolt from speedbrake push rod at speedbrake lever.

(15) Disengage roll disconnect cable from roll disconnect handle (Ref. 27-11-04).

(16) Disengage pitch disconnect cable from pitch disconnect handle (Ref. 27-41-35).

(17) Remove parking brake cable assembly (Ref. 32-48-03).

(18) Disconnect three pedestal harness assembly cannon plugs and install protective caps [Ref. Fig. 401 (Sheet 1)].

(19) Remove eight screws securing pedestal to center console [Ref. Fig. 401 (Sheet 2)].

CAUTION: TO PREVENT POSSIBLE DAMAGE, TRIM CONTROL VERTICAL SHAFT MUST BE SUPPORTED AS PEDESTAL IS REMOVED FROM CENTER CONSOLE.

R (20) Support trim control vertical shaft and lift pedestal
R from center console.

R B. Installation

R (1) Ensure circuit breakers are pulled and systems are
R tagged as described in Paragraphs 3A(1) thru 3A(6).

R (2) Verify rig pin (R3) is installed in pitch trim forward
R cable drum.

R (3) Position First Officers pitch trim wheel pointer to 4
R degrees, within area of blue dot.

R (4) Install pedestal on center console while coupling trim
R control spline shaft to trim control vertical shaft
R [Ref. Fig. 401 (Sheet 1)].

R NOTE: Trim control spline shaft and vertical shaft
R will be coupled as the pedestal is being lowered
R onto center console.

R Trim wheel must remain at 4 degrees (within area
R of blue dot) while spline and vertical shaft are
R being coupled.

R (5) Install eight screws securing pedestal to the center
R console [Ref. Fig. 401 (Sheet 2)].

R (6) Install edge lighted panel on pedestal with screws
R [Ref. Fig. 401 (Sheet 2)].

R (7) Install CTR CONSOLE ENGINE INSTR panel on pedestal with
R screws.

R (8) Install knobs on CTR CONSOLE ENGINE INSTR panel and
R tighten setscrews.

R (9) Remove protective caps and connect three pedestal
R harness assembly cannon plugs [Ref. Fig. 401 (Sheet
R 1)].

R (10) Install pitch disconnect cable on pitch disconnect
R handle (Ref. 27-41-35).

R (11) Install roll disconnect cables on roll disconnect
R handle (Ref. 27-11-04).

R (12) Install parking brake cable assembly (Ref. 32-48-03).

R (13) Install vertical push rods on pedestal controls as
R follows (Ref. Fig. 402):

(a) Install speedbrake push rod on speedbrake lever with bolt, washers, nut and cotter pin.

(b) Install throttle push rods on throttle bellcranks with spacers, bolt, washer, nut and cotter pin.

(c) Install flap push rod on flap handle with bolt, washer, nut and cotter pins.

(14) In FESC, remove rig pin (R3) from bracket and forward pitch trim cable drum beneath flight station floor.

(15) With all engine power control levers full forward, position throttle stand wire harness in trough and install throttle stand cover taking care not to damage lever seals. Verify seal lips are in outward position and install cover screws [Ref. Fig. 401 (Sheet 1)].

(16) Remove screws and access cover on aft side of throttle stand cover (access cover located just below fuel and ignition switches). Through access opening, verify throttle stand wire harness is stowed in trough attached to aft side of pedestal support [Ref. Fig. 401 (Sheet 1)].

(17) Operate all three engine power control levers through full forward thrust range (DO NOT OPERATE REVERSE THRUST LEVERS).

Verify that engine power control lever mechanism does not foul wire harness. Position throttle levers to zero. Install access cover on throttle stand cover with screws.

(18) Check operation of speedbrake lever (Ref. 27-61-01).

(19) Check pitch disconnect cable adjustment (Ref. 27-41-35).

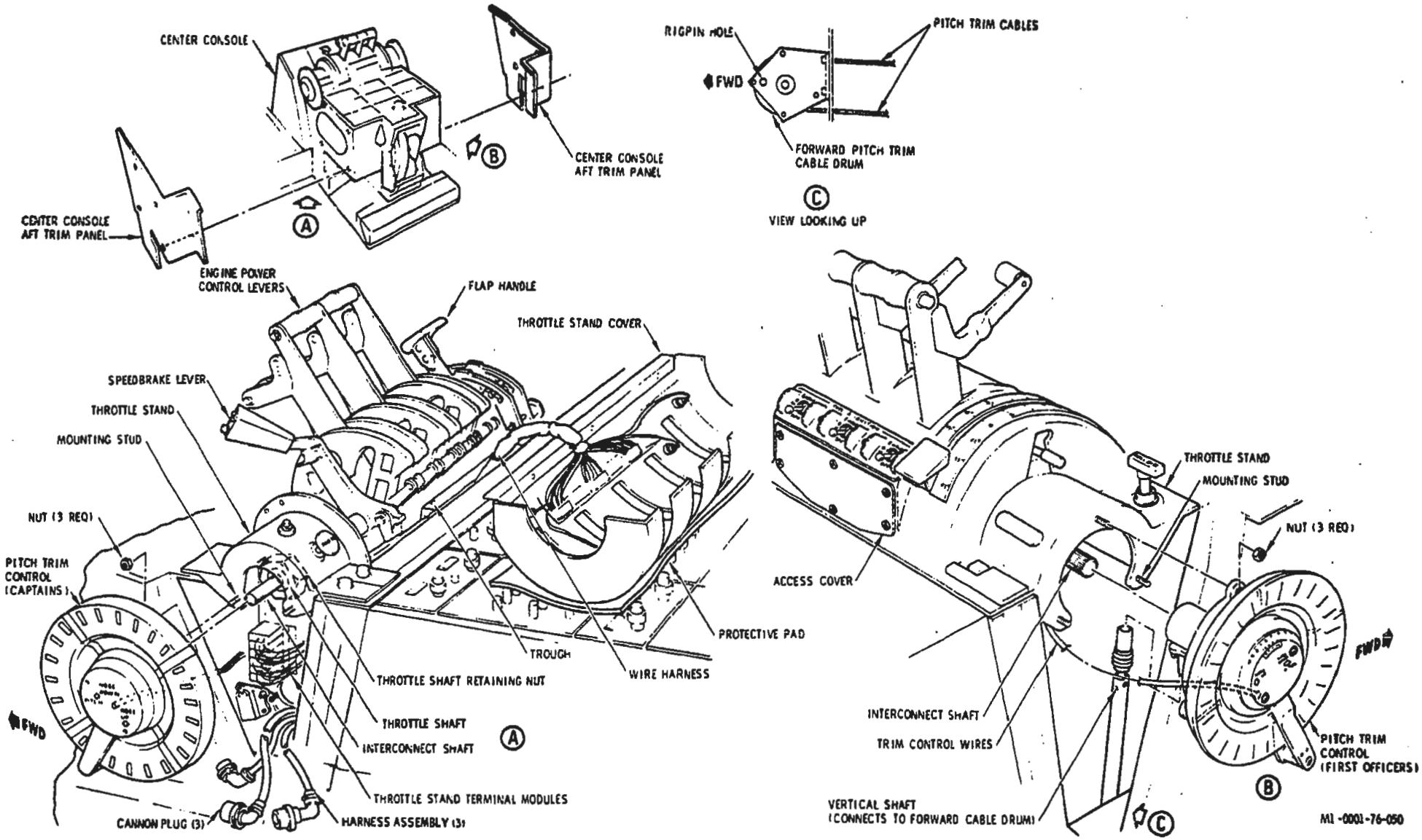
(20) Check roll disconnect and lost motion device cable adjustment (Ref. 27-11-04).

R (21) Check throttle control levers to autothrottle clutch rigging and perform Autothrottle Clutch Quick Check 76-11-00).

(22) Install center console trim covers (Ref. 25-13-05) and [Ref. Fig. 401 (Sheet 1)].

(23) Remove system tags and close circuit breakers opened in Paragraphs 3A(1) thru 3A(6).

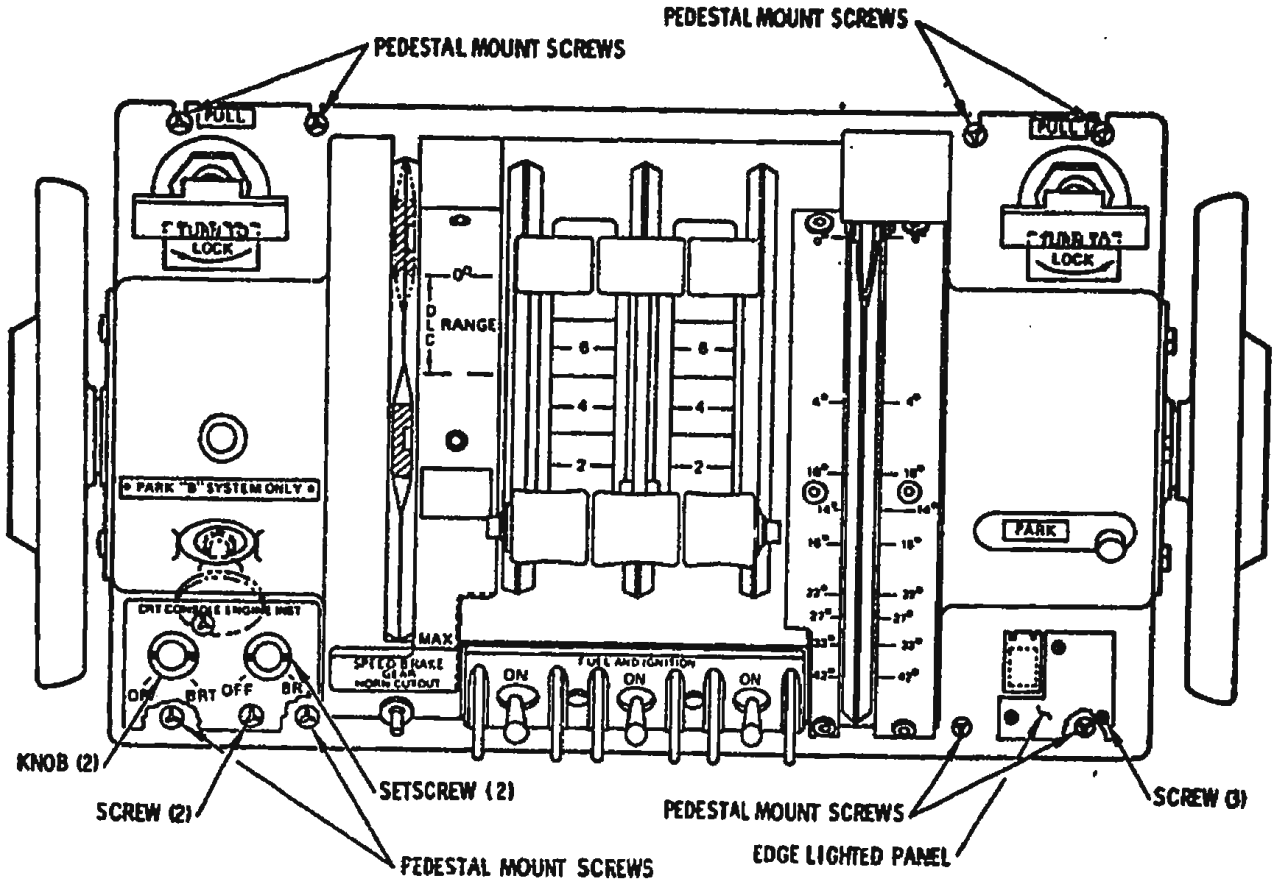
(24) Close FESC access door 112AB.



R Center Console Pedestal - Removal and Installation
R Figure 401 (Sheet 1)

EFFECTIVITY: ALL

001B



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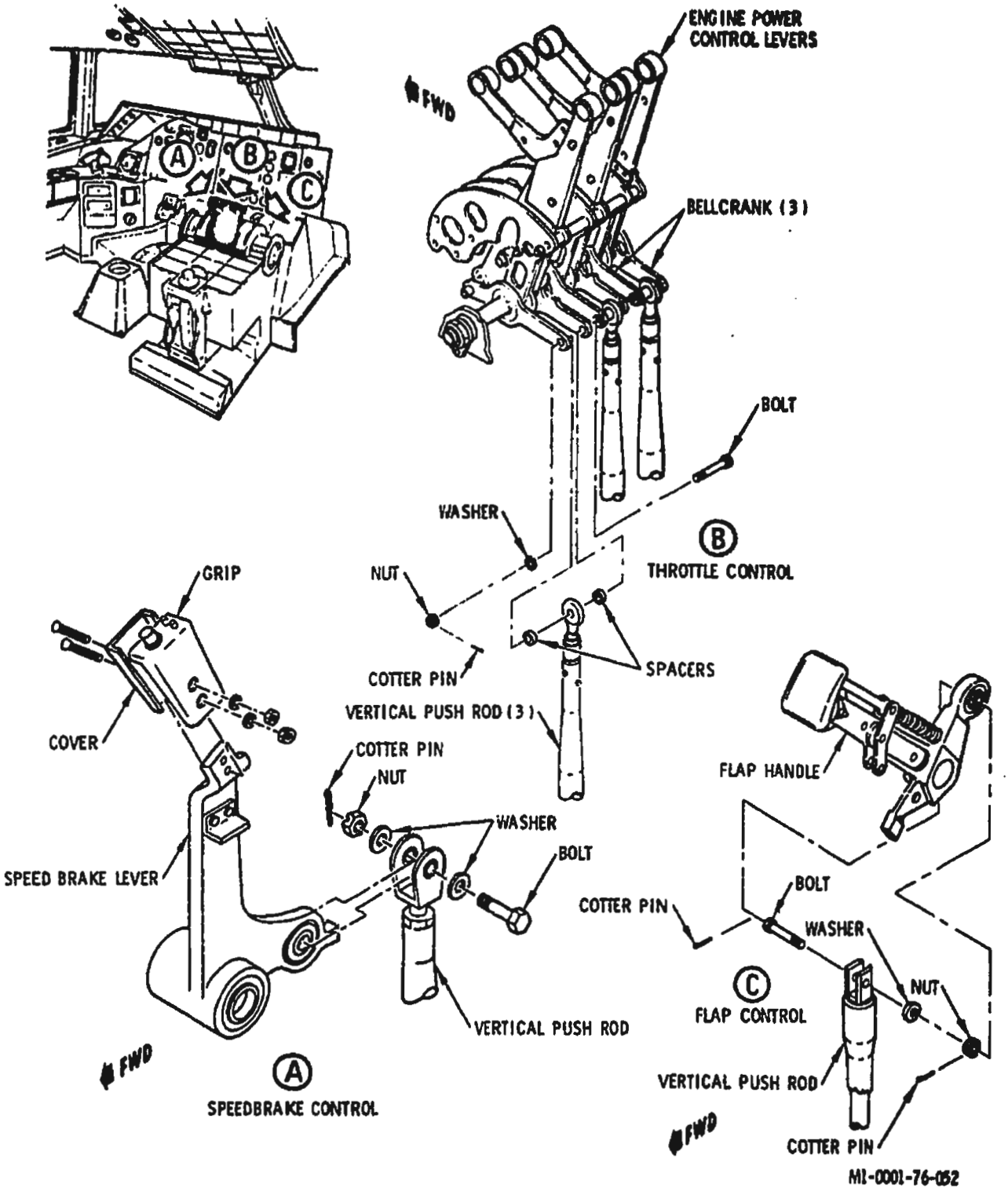
R Center Console Pedestal - Removal and Installation
R Figure 401 (Sheet 2)

R EFFECTIVITY: ALL
R
001B



R Pedestal Control Levers - Removal and Installation
R Figure 402

EFFECTIVITY: ALL

ENGINE POWER AND THRUST REVERSER CONTROL LINKAGE REMOVAL AND INSTALLATION

1. General

Procedures are provided for removal and installation of the mixing mechanism assembly (Para. 4) and the fuel flow regulator box (Para. 5).

2. Equipment and Materials

Lock-wire; Fed Spec QQ-W-390, 21 AWG, 0.032-inch diameter; British Spec DTD.189A, 22 SWG; OMat Item No. 238 or equivalent

Jointing compound, British Spec DTD.900/4586 (Hylomar light), or equivalent

Degreasing fluid (Inhibited 1.1.1) (Trichlorethane); British Spec B.S.4487:1969, American Spec MIL-T-81533, O Mat 1/21, or equivalent

Rigging Pin, Rolls-Royce PN 3502230 or BLC-3R-05N, or equivalent

Rigging Pin, Rolls-Royce PN UT.993, or equivalent

Clean stiff-bristled brush

R Grease, Dow Corning DC.33, or equivalent

3. Referenced Procedures

70-02-01	Identification, Lubrication and Fitting of Rubber Seal Rings
71-11-01	Left-Hand Hinged Cowl - Removal/Installation
71-11-02	Right-Hand Hinged Cowl - Removal/Installation
71-12-01	LH and RH Lower Hinged Cowl - Servicing
71-12-05	LH and RH Upper Hinged Cowl - Servicing
73-38-02	Throttle Angle Position Transducer - Removal and Installation
76-11-00	Engine Control System - Adjustment and Test

RR SB 76-2207 - Rod end of relay link assembly rotated 90 degrees and introduction of self locking castellated nuts

RR SB 76-2496 - Aircraft pick-up rod to engine power and thrust reverser mixing mechanism control linkage - Introduction of retained bolt

RR SB 76-2141 - Introduction of debris guard

RR SB 76-2959 - Introduction of a support bracket for fuel flow regulator box assembly

RR SB 36-2441 - Introduction of thrust reverser de-activating valve

Teleflex SB 27201-73-01 - Introduction of longer bolts and spacers

RR SB 76-3241 - Strengthened clipping of teleflex control cable adjacent to FFR box assembly

RR SB 72-5240 - Gasket introduced between FFR box and input drive housing

4. Removal/Installation Mixing Mechanism Assembly

A. Removal

(1) On pilots center console, zone 210, tag applicable APU/GRD AIR TO REVERSERS switch.

(2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable circuit breaker THRUST REVERSE (H16, H17, or H18).

(3) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable circuit breaker START AIR VALVE (N3, N9, or N15).

(4) On pilots overhead panel, zone 210, tag applicable ENGINE START panel switchlights.

(5) Remove left-hand hinged cowl 413A or 423A (Ref. 71-11-01) and right-hand hinged cowl 414A or 424A (Ref. 71-11-02) for engines No. 1 and 3, or open hinged cowls 433AL and 434AR (Ref. 71-12-01) and 433DL and 434DR (Ref. 71-12-05) for engine No. 2.

(6) On engines with RR SB76-2207, remove cotter pin, nut, washer, and bolt (1).

(6) On engines without RR SB76-2207, remove cotter pin, nut and bolt (1) and (2) (Ref. Fig. 401).

(7) On engines with RR SB76-2496, remove cotter pin, nut, washer, retaining washer and bolt (3).

(7) On engines without RR SB76-2496, remove cotter pin, nut and bolt (3).

(8) Remove cotter pin, nut and washer (4), lift control rod (A) clear then install washer and nut to bolt.

NOTE: Bolt (4) can only be removed when the mixing mechanism assembly is removed from the engine.

(9) Disconnect casing and cable terminal (5) from mixing mechanism assembly.

(10) Remove cover and nameplate assembly (6).

(11) Remove bolts (7).

(12) Remove mixing mechanism assembly from engine and place on a clean work surface.

(13) Remove nut, washer and bolt (4).

(14) On engines with RR SB76-2141, remove debris guard and baulk blocks (8) and (9).

(14) On engines without RR SB76-2141, remove baulk blocks (8) and (9).

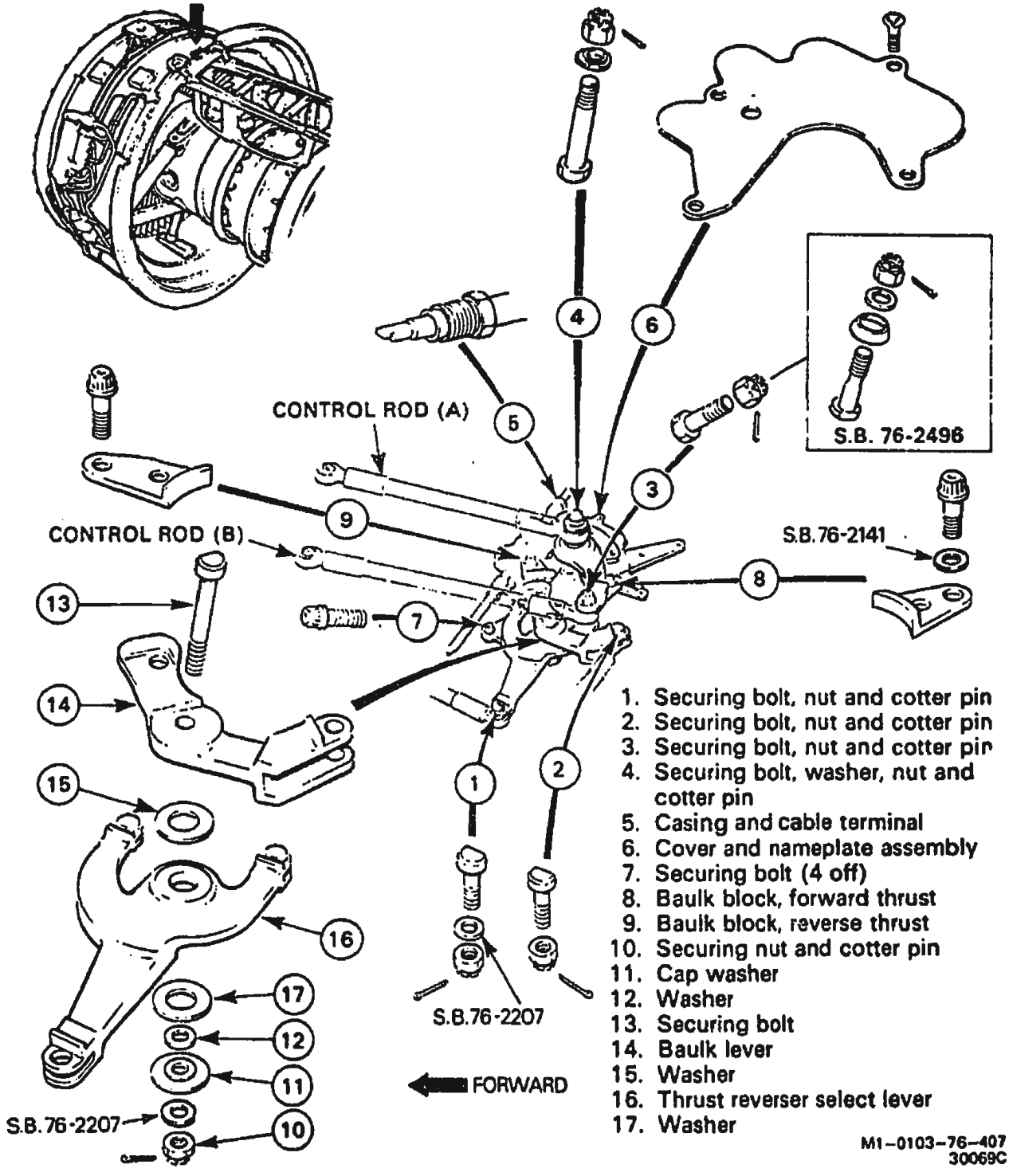
(15) On engines with RR SB76-2207, remove cotter pin, nut, and washer (10), washers (11) and (12), and bolt (13).

(15) On engines without RR SB76-2207, remove cotter pin and nut (10) washers (11) and (12), and bolt (13).

(16) Remove baulk lever (14), washer (15), select lever (16) and washer (17).

(17) Install cover and nameplate assembly (6).

B. Installation



Mixing Mechanism Assembly - Removal and Installation
Figure 401

(1) Place mixing mechanism assembly on a clean work surface and remove cover and nameplate assembly (6) (Ref. Fig. 401).

(2) Install washer (17), select lever (16), washer (15) and baulk lever (14) then secure with bolt (13), washers (12) and (11), and nut and cotter pin (10).

On engines with RR SB76-2207, install washer under nut (10).

(3) On engines with RR SB76-2141, install baulk blocks (9) and (8) to ensure positive dowel location, then install debris guard.

(3) On engines without RR SB76-2141, install and secure baulk blocks (9) and (8)to ensure positive dowel location.

(4) Install bolt, washer and nut (4), tightening nut sufficiently to retain bolt in position.

(5) Position mixing mechanism on LP compressor case and secure with bolts (7).

(6) Install cover and nameplate assembly (6).

(7) Connect cable terminal and casing (5) to mixing mechanism assembly. Torque tighten casing connector 35 to 45 lb in. (3.957-5.088Nm), then lock-wire.

(8) Remove nut and washer (4), fit control rod (A) and secure with washer, nut and cotter pin.

(9) On engines with RR SB76-2496, locate control rod (B) then secure with bolt, new retaining washer, washer, nut and cotter pin (3).

(9) On engines without RR SB76-2496, locate control rod (B) then secure with bolt, nut and cotter pin (3).

(10) On engines with RR SB76-2207, install bolt, nut, and cotter pin (2), and bolt, washer, nut, and cotter pin (1).

(10) On engines without RR SB76-2207, install bolt, nut, and cotter pin (1) and (2).

(11) Set engine power and thrust reverser control linkage (Ref. 76-11-00, Adjustment and Test).

(12) Install left-hand hinged cowl 413A or 423A (Ref. 71-11-01) and right-hand hinged cowl 414A or 424A (Ref. 71-11-02) for engines No. 1 and 3, or close hinged cowls 433AL and 434AR (Ref. 71-12-01) and 433DL and 434DR (Ref. 71-12-05) for engine No. 2.

(13) Remove tags and close circuit breakers opened in Steps 4A(1) through (4).

5. Removal/Installation - Fuel Flow Regulator (FFR) Box

CAUTION: WHEN REMOVING THE FUEL FLOW REGULATOR BOX DO NOT SEPARATE THE HOUSING ASSEMBLY FROM THE SUPPORT BRACKET (REF. FIG. 402).

A. Removal

(1) On pilots center console, zone 210, tag applicable APU/GRD AIR TO REVERSERS switch.

(2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable circuit breaker THRUST REVERSE (H16, H17, or H18).

(3) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable circuit breaker START AIR VALVE (N3, N9, or N15).

(4) On pilots overhead panel, zone 210, tag applicable ENGINE START panel switchlights.

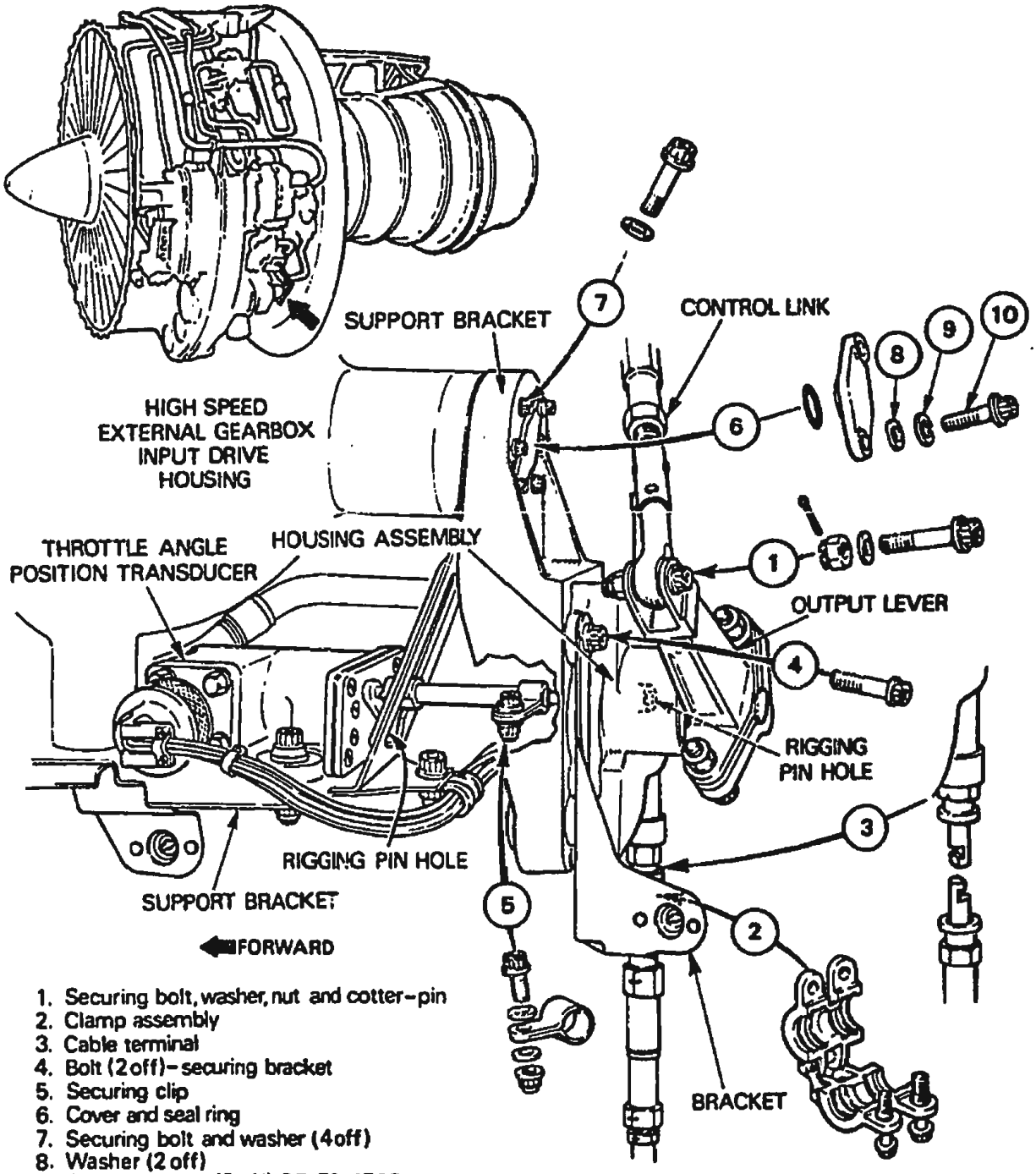
(5) Open left-hand hinged cowl 413A or 423A and right-hand hinged cowl 414A or 424A (Ref.71-11-00) for engines No. 1 and 3 or 433AL and 434AR (Ref. 71-12-01) for engine No. 2.

(6) Remove cotter pin, nut, washer and bolt (1) (Ref. Fig. 402).

(7) Remove clamp assembly (2) then disconnect cable terminal (3) from fuel flow regulator box.

(8) On engines without RR SB76-2959 and Teleflex SB 27201-73-1,
remove bolts (4), move clipping bracket aside, then replace bolts.

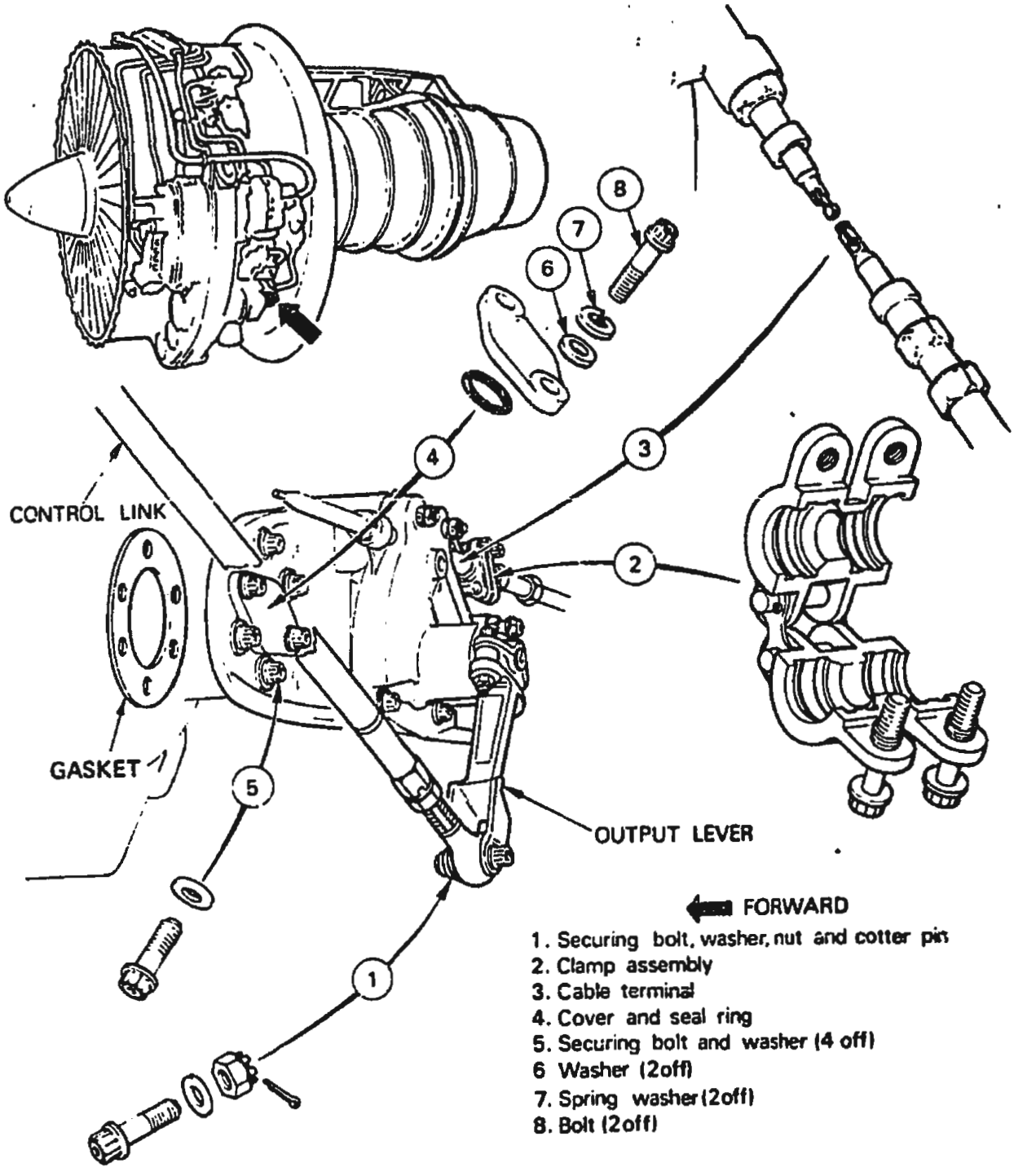
(8) On engines with RR SB76-2959 and fuel flow regulator (FFR) boxes with Teleflex SB 27201-73-1,
release quick release fastener securing fire detector sensor assembly, remove bolts (1) and (2) (Ref. Fig.



Fuel Flow Regulator Box - Removal and Installation
Figure 402

R
R
001B

EFFECTIVITY: ENGINES WITHOUT RR SB72-5240



R Fuel Flow Regulator Box - Removal and Installation
R Figure 402

EFFECTIVITY: ENGINES WITH RR SB72-5240

403) then remove support bracket (3). Install bolts (2) in FFR box.

(9) Remove securing clip (5) (Ref. Fig. 402).

(10) On engines without RR SB72-4763, remove bolts (10) and washers (8) then cover and seal ring (6) (Ref. Fig. 402).

(10) Onengines with RR SB72-4763, remove bolts (10), washers (9) and (8) then cover and seal ring (6).

NOTE: On engines with RR SB72-5240, discard gasket seal.

(11) Remove bolts and washers (7) then remove fuel flow regulator box from engine.

B. Installation

WARNING: WHEN USING DEGREASING FLUID, AVOID SKIN CONTACT AND INHALING THE VAPOR.

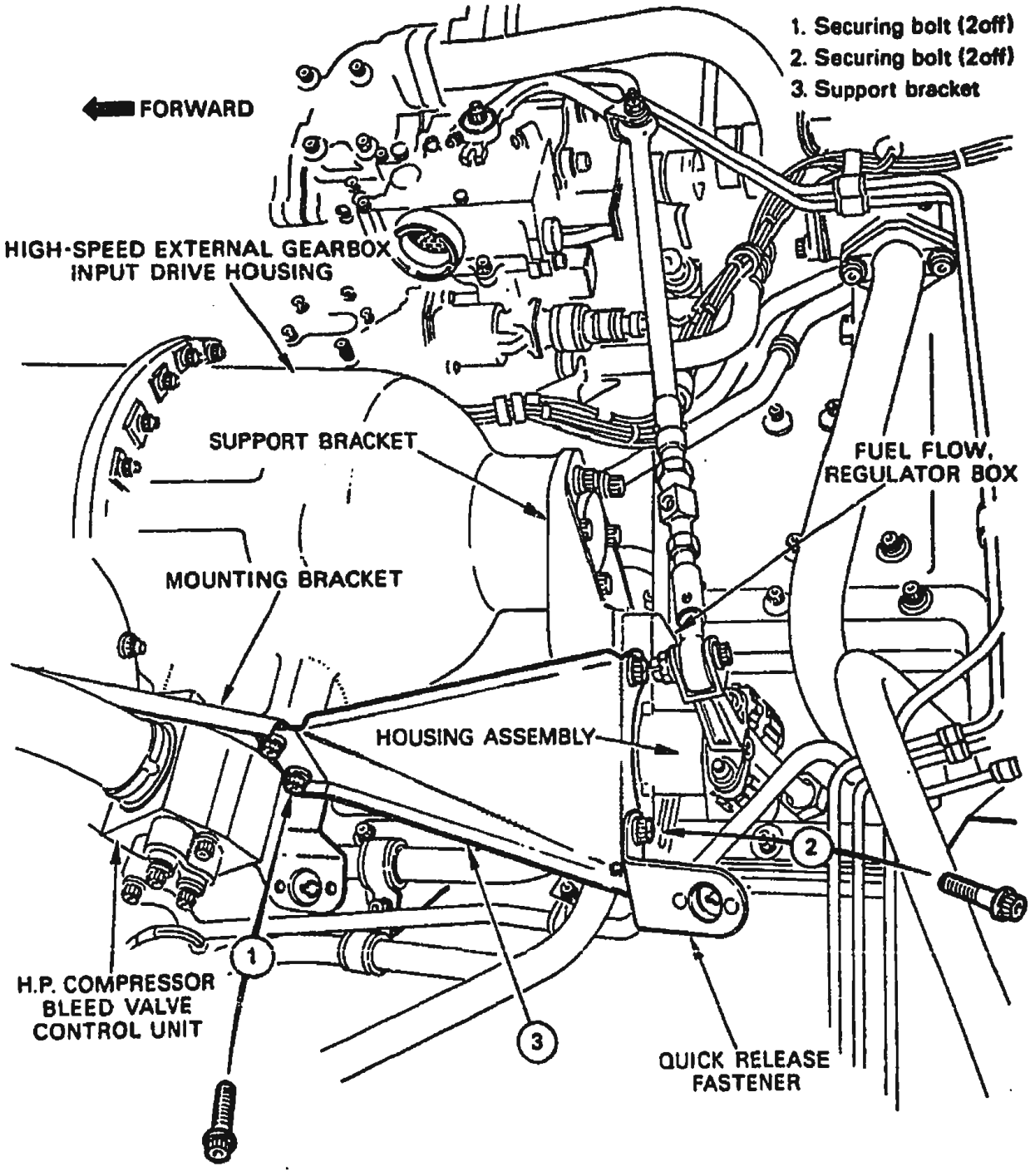
(1) Using cold liquid degreasing fluid, remove all traces of old jointing compound from mating face on high-speed external gearbox input drive housing and also clean mating face on fuel flow regulator box.

CAUTION: ON ENGINES WITHOUT RR SB72-5240, A GASKET SEAL MUST NOT BE FITTED BETWEEN THE FFR BOX AND INPUT DRIVE HOUSING.

(2) On engines without RR SB72-5240, brush apply thin film of jointing compound to transducer support bracket, input drive housing and fuel flow regulator box mating faces; allow compound to air dry for a minimum period of 10 minutes.

NOTE: Align rigging pin holes in gear sector and case of fuel flow regulator box, then insert rigging pin UT.993 and align slot in locating plate of transducer with rigging pin hole in transducer body then insert rigging pin 3502230 or BLC-3R-05N.

CAUTION: ON ENGINES WITH RR SB72-5240,330 WHEN INSTALLING GASKET SEAL IT IS ESSENTIAL THAT ALL BOLT HOLES ARE ALIGNED. ONE BOLT HOLE IN THE 2 O'CLOCK POSITION IS OFFSET. CORRECT ALIGNMENT OF BOLT HOLES CAN ONLY BE ACHIEVED WHEN GASKET SEAL IS FITTED WITH OFFSET HOLE IN CORRECT POSITION.



Fuel Flow Regulator Box Support Bracket Disconnect Points
Figure 403

(2) On engines with RR SB72-5240, brush apply thin film of jointing compound to transducer support bracket, input drive housing, fuel flow regulator box mating faces, and both sides of gasket seal; allow compound to air dry for a minimum period of 10 minutes.

(3) Locate fuel flow regulator box (Ref. Fig. 402) ensuring that hose is correctly located on drive shaft at rear of fuel flow regulator box, then secure with bolts and washers (7), and clip (5) (Ref. 73-38-02). Remove rigging pins UT.993 and 3502230 or BLC-3R-05N.

(4) Install and lubricate (Ref. 70-02-01) new seal ring to cover (6).

(5) On FFR boxes incorporating Teleflex SB 28906-73-1, position cover (5) on FFR box.

(5) On FFR boxes not incorporating Teleflex SB 28906-73-1, position cover (5) on box, ensuring positive location of hollow dowel.

(6) On engines without RR SB72-4763, install washer (7) and bolt (9).

(6) On engines with RR SB72-4763, install washers (7), (8) and bolt (9).

(7) On engines without RR SB76-2959 and Teleflex SB 27201-73-1, remove bolts (4), locate bracket, then install and secure bolts.

(7) On engines with RR SB76-2959 and FFR boxes incorporating Teleflex SB 27201-73-1, remove bolts (2) (Ref. Fig. 403) from FFR box. Locate support bracket (3) on HP compressor bleed valve control unit mounting bracket and FFR box; secure with bolts (2) and (1). Secure fire detector sensor assembly quick release fastener.

NOTE: When installing new FFR boxes with Teleflex SB 27201-73-1, remove and discard spacers under bolt (2).

(8) Connect cable terminal (3) (Ref. Fig. 402) to fuel flow regulator box then install and secure clamp assembly (2). Torque tighten clamp bolts 25 to 30 lb in. (2.827-3.392Nm), and lock-wire bolts.

(9) Correctly locate control link in fork end of output lever of fuel flow regulator box and secure with bolt, C washer, new nut and cotter pin (1).

(10) Set engine power and thrust reverser control linkage (Ref. 76-11-00).

(11) Close left-hand hinged cowl 413A or 423A and right-hand hinged cowl 414A and 424A (Ref. 71-11-00) for engines No. 1 and 3 or 433AL and 434AR (Ref. 71-12-01) for engine No. 2.

(12) Remove tags and close circuit breakers opened in Step 5A(1) through (4).

6. Removal/Installation - Cable and Casing Assembly

A. Removal

(1) On pilots center console, zone 210, tag applicable APU/GRD AIR TO REVERSERS switch.

(2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable circuit breaker THRUST REVERSE (H16, H17, or H18).

(3) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable circuit breaker START AIR VALVE (N3, N9, or N15).

(4) On pilots overhead panel, zone 210, tag applicable ENGINE START panel switchlights.

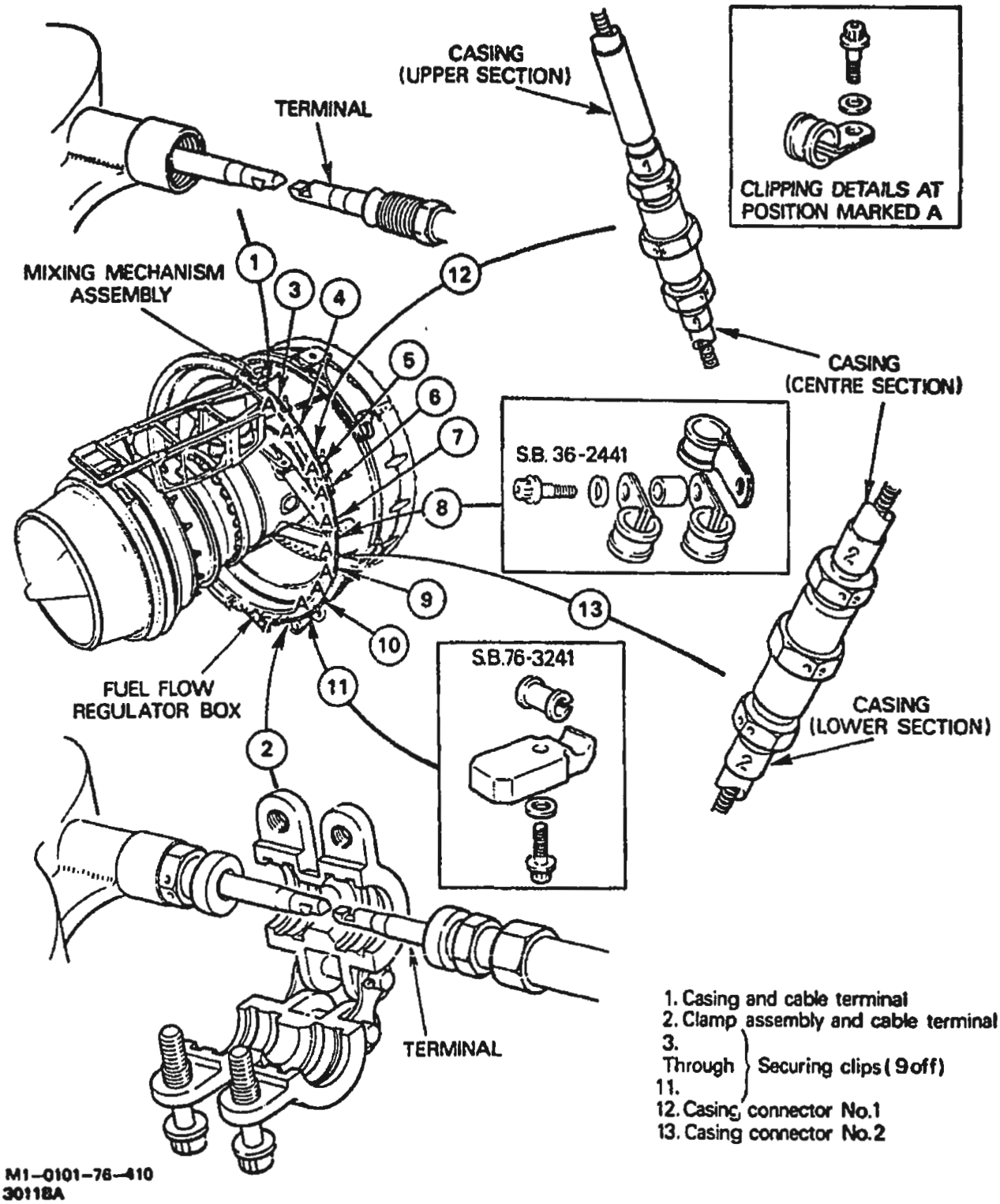
(5) Remove right-hand hinged cowl 414A or 424A (Ref. 71-11-02, Removal/Installation) for engines No. 1 and 3 or open hinged cowls 434AR (Ref. 71-12-01) and 434DR (Ref. 71-12-05) for engine No. 2.

434DR (Ref. 71-12-05, Removal/Installation) for engine No. 2.

(6) Disconnect casing and cable terminal (1) from mixing mechanism assembly (Ref. Fig. 404).

(7) Remove clamp assembly (2) then disconnect cable terminal from fuel flow regulator box.

CAUTION: DO NOT COIL CABLE ASSEMBLY LESS THAN 14 INCHES (355.60 mm) IN DIAMETER.



Cable and Casing Assembly - Removal and Installation
Figure 404

(8) Working from fuel flow regulator box end, remove cable assembly from casing and, using clean lint-free cloth, clean cable assembly and place in a plastic bag.

(9) Remove clips (3) through (11).

On engines with RR SB36-2441,
remove bolt, washer, spacer, and clip (8).

On engines with RR SB76-3241,
remove bolt, washer, upper half clamp, and bushing (11).

NOTE: Lower half clamp is attached to fuel drains tank mounting bracket.

(10) Remove casing assembly from LP compressor case and place on a clean work surface.

(11) Disconnect casing upper section from center section at connector (12) and casing center section from lower section at connector (13).

B. Installation

(1) Place casing assembly on a clean work surface (Ref. Fig. 404). Connect casing lower section to center section at connector (13) and casing center section to upper section at connector (12) finger-tight.

(2) Position casing assembly around right-hand side of LP compressor case then loosely install clips (3) through (11).

On engines with RR SB36-2441,
loosely install clip (8) ensuring that clips securing air tubes are correctly located.

On engines with RR SB76-3241,
loosely fit bushing, upper half clamp, washer, and bolt (11).

NOTE: Lower half clamp is attached to fuel drains tank mounting bracket.

(3) Apply a light coating of grease to cable assembly.

NOTE: Do not apply grease to cable terminals.

(4) Working from fuel flow regulator box end, feed cable through casing assembly until terminal protrudes from casing at mixing mechanism assembly end.

(5) Rotate cable terminal through 360 degrees stopping at 90 degree intervals to check cable terminal remains in position when released. If any rotational movement is apparent when terminal is released the cable should be removed, a new cable installed, and the rotational check repeated.

CAUTION: THE CASING SHOULD BE SET STRAIGHT AND SQUARE TO THE MIXING MECHANISM ASSEMBLY BY CAREFUL MANIPULATION ONLY. THE CASING SHOULD NOT BE BENT OR TWISTED TO ACHIEVE ALIGNMENT.

(6) Connect cable terminal and casing (1) to mixing mechanism assembly and finger tighten casing connector.

CAUTION: THE CASING SHOULD BE SET STRAIGHT AND SQUARE TO THE FFR BOX BY CAREFUL MANIPULATION ONLY. THE CASING SHOULD NOT BE BENT. OR TWISTED TO ACHIEVE ALIGNMENT.

(7) Connect cable terminal and casing (1) to mixing clamp assembly (2).

(8) Torque tighten casing connectors (12) and (13) to between 35 and 45 lb in. (3.9 and 5.0 Nm.) then lock-wire.

(9) Tighten clip bolts (11) through (3).

(10) Torque tighten casing connector (1) at mixing mechanism assembly to between 35 and 45 lb in. (3.9 and 5.0 Nm) lock-wire.

(11) Remove clamp assembly (2) and check casing is aligned with FFR box then disconnect cable terminal from FFR box.

(12) Operate the input lever on the mixing mechanism assembly approximately 12 times in order to release any torque in the cable.

(13) Check the angular relationship of the cable terminal to the FFR box is ± 15 degrees. If angular relationship is not correct the cable should be removed, a new cable installed, and angular relationship checked.

CAUTION: THE CASING SHOULD NOT BE BENT OR TWISTED DURING INSTALLATION OF CLAMP ASSEMBLY (2).

(14) Ensure casing and FFR box are aligned then connect cable terminal.

(15) Fit and secure clamp assembly (2), torque tighten to between 25 and 32 lb in. (2.8 and 3.6 Nm.) then lock-wire.

(16) Set engine power control linkage (Ref. 76-11-00).

(17) Install right-hand hinged cowl 414A or 424A (Ref. 71-11-02) for engines No. 1 and 3 or close hinged cowls 434DR (Ref. 71-12-05) and 434AR (Ref. 71-12-01) for engine No. 2.

(18) Remove tags and close circuit breakers opened in Steps A(1) through (4).

C 7. Incorporation of Shock Mounted Throttle Box Modification.

C A. A service evaluation of shock mounted throttle boxes has
C been successfully completed. A fleet-wide incorporation of
C this mod will soon be accomplished by M.O. 99638.

C B. Installation of this assembly must be done in sets of one
C throttle box bracket, TWA Stk. Nbr. 261-7700 (Mfr. P/N
C A01797-1) and one fire warning bracket assembly, TWA Stk.
C Nbr. 61-7701 (Mfr. P/N G00963-1). The new fire warning
C bracket will accompany each new throttle box assembly in
C initial shipments of spares to the field. Return all
C removed hardware to MCI after modification.

C C. The M11-76-01 throttle box check procedure is not affected
C by this M.O.

C CAUTION: DO NOT DISASSEMBLE THE NEW THROTTLE BOX DURING THE
C M11-76-01 CHECK.

ENGINE POWER AND THRUST REVERSER CONTROL LINKAGE INSPECTION AND CHECK

1. Referenced Procedures

71-11-00	Engines No. 1 and 3 Cowling - Maintenance Practices
71-12-00	Engine No. 2 Cowling - Maintenance Practices
71-12-01	L.H. and R.H. Lower Hinged Cowls - Maintenance Practices
76-11-00	Engine Control System - Adjustment and Test
76-11-02	Engine Power and Thrust Reverser Control Linkage - Removal and Installation

R Service Bulletins Referred To:

R RR SB76-2207 - Rod end of relay link assembly rotated 90 degrees
R and introduction of self locking castellated nuts

R RR SB76-2675 - Thrust reverser feedback control linkage -
R Inverted securing bolt

R RR SB76-2496 - Aircraft pick-up rod to engine power and thrust
R reverser mixing mechanism control linkage - Introduction of
R retained bolt

R RR SB76-2652 - Teleflex Controls - Wear in dovetails of control
R cable terminals and lower control box rack and on gear sector
R and rack teeth

2. Inspection/Check

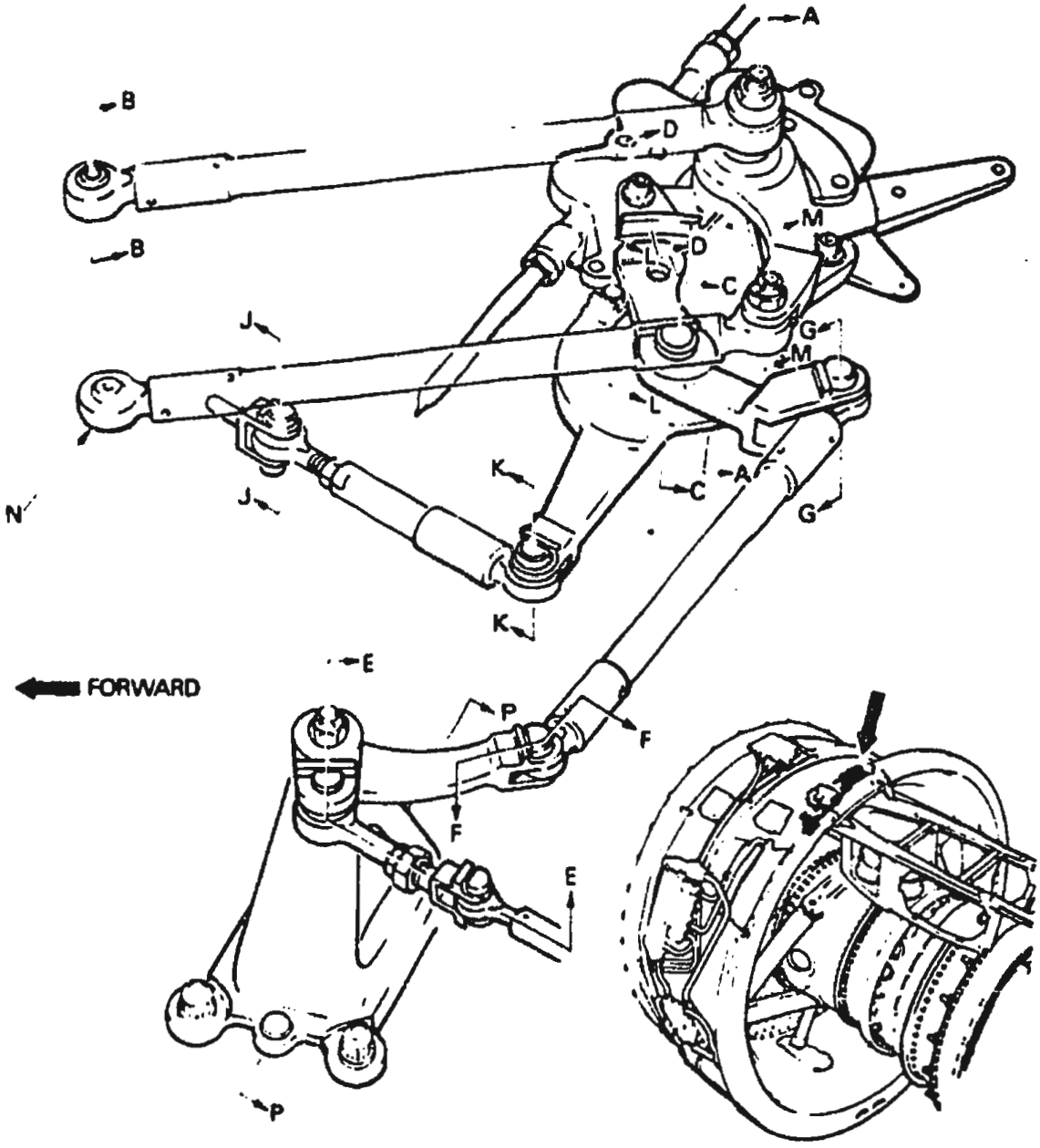
A. Inspection

(1) Inspect engine power and thrust reverser control linkage for wear (Ref. Fig. 601 and 602).

B. Engine Controls Movement Check

(1) Check controls for freedom and full range of movement as follows:

(a) On pilots center control pedestal, zone 210, tag applicable APU/GRD AIR TO REVERSERS switch.

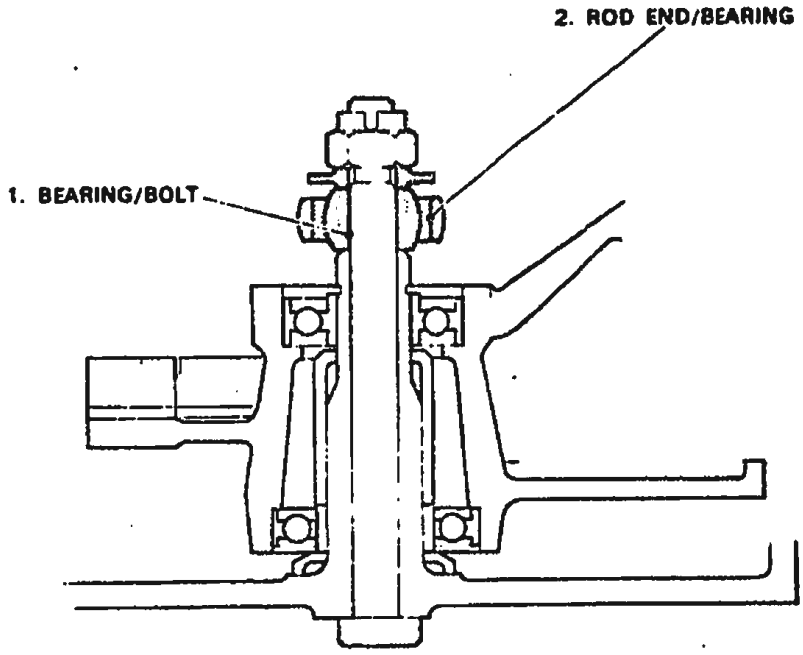


M1-0101-76-601
25544A

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 1)

EFFECTIVITY: ALL

0018



SECTION A-A

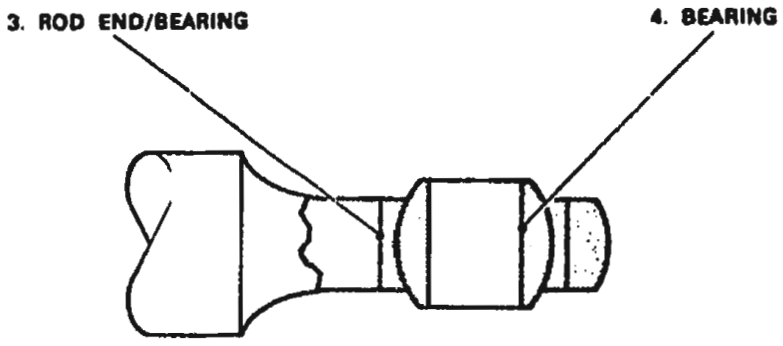
ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX. WEAR DIM.	MAX. DIA. CLEARANCE
			MIN.	MAX.		
1	BEARING	ID	0·3120	0·3125	0·3130	0·0020
	BOLT	OD	0·3114	0·3120	0·3110	
2	ROD END	ID	0·6874	0·6879	—	—
	BEARING	OD	0·6870	0·6875	—	

HH 9803
M1-0100-76-602
25545

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 2)

EFFECTIVITY: ALL

001B



SECTION B-B

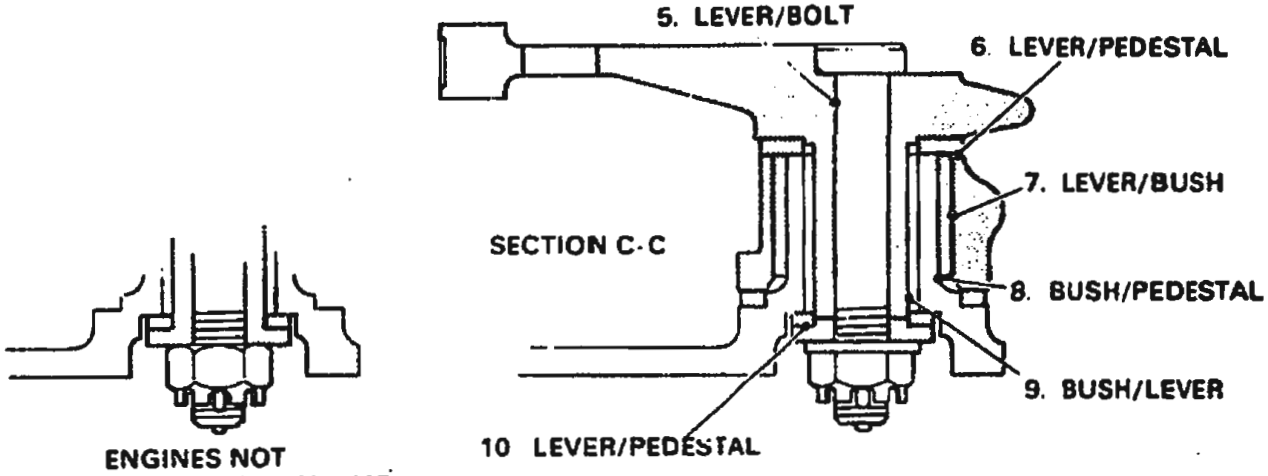
ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX. WEAR DIM.	MAX. DIA. CLEARANCE
			MIN.	MAX.		
3	ROD END	ID	0·6874	0·6879	—	—
	BEARING	OD	0·6870	0·6875	—	
4	BEARING	ID	0·3120	0·3125	0·3130	—

HH 9804
M1-0100-76-603
25548

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 3)

EFFECTIVITY: ALL

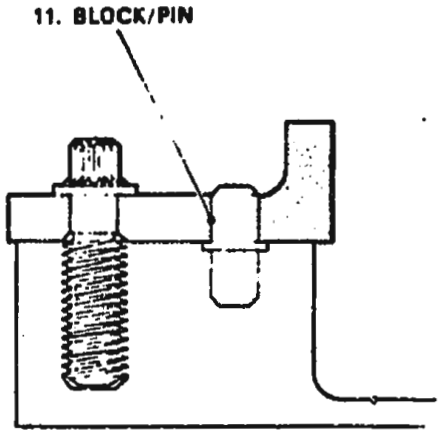
001B



ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX. WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
5	LEVER	ID	0·2505	0·2514	0·2520	0·0035
	BOLT	OD	0·2489	0·2495	0·2485	
6	LEVER	—	—	—	—	0·0100 END FLOAT
	PEDESTAL	—	—	—	—	
7	LEVER	—	—	—	—	LIGHT TIGHT FIT
	BUSH	—	—	—	—	
8	BUSH	ID	0·7865	0·7899	0·7900	0·0060
	PEDESTAL	OD	0·7847	0·7860	0·7840	
9	BUSH	—	—	—	—	—
	LEVER	OD	0·4700	0·4711	0·4690	
10	LEVER	—	—	—	—	0·0100 END FLOAT
	PEDESTAL	—	—	—	—	

M1-0101-76-604
25847A

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 4)

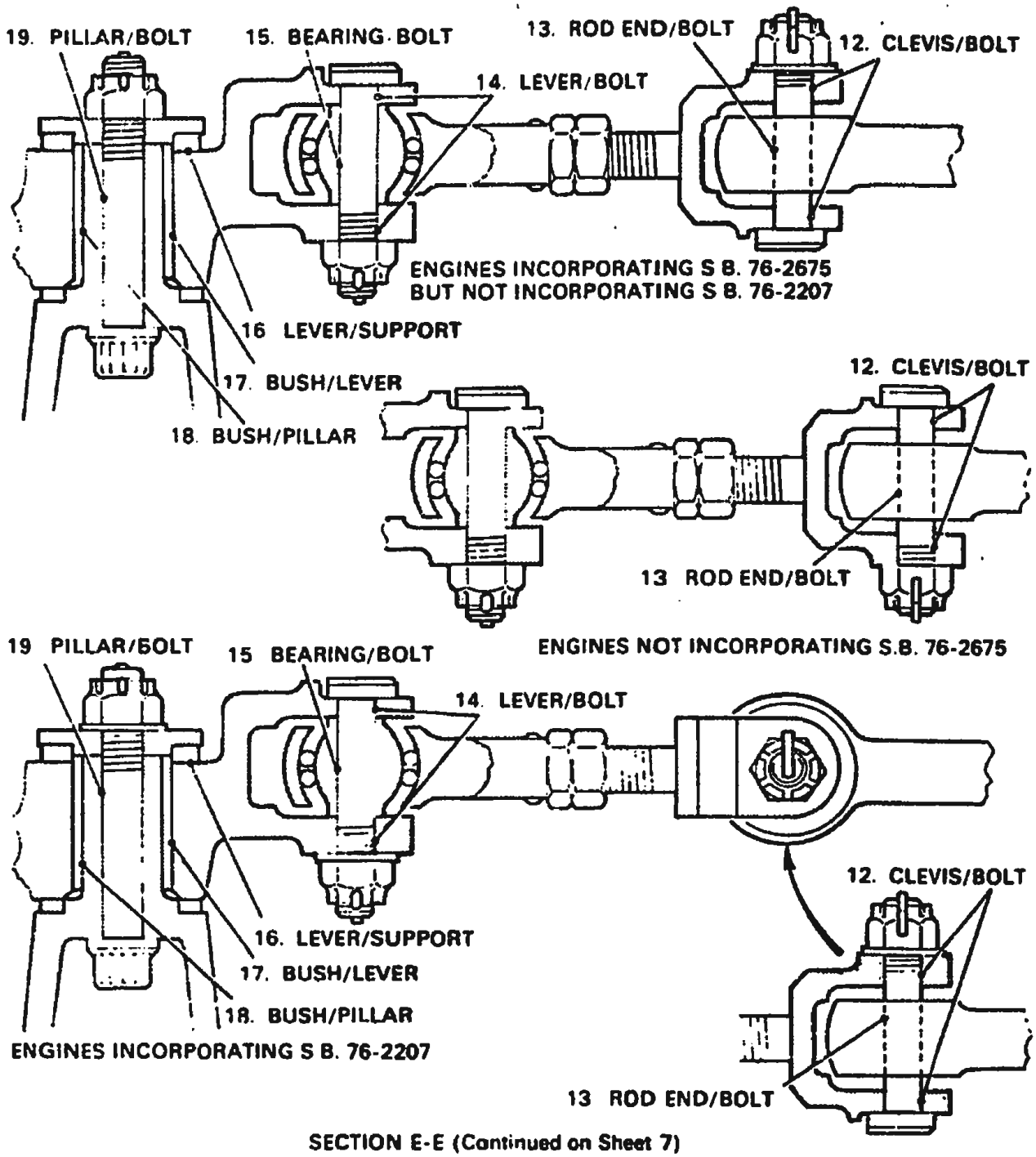


SECTION D-D

ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX. WEAR DIM.	MAX. DIA. CLEARANCE
			MIN.	MAX.		
11	BLOCK	ID	0·2374	0·2386	0·2392	—
	PIN	OD	—	—	—	

HH 9806
M1-0100-76-605
25548

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 5)



SECTION E-E (Continued on Sheet 7)

M1-0100-76-615
30441

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 6)

ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
12	CLEVIS	ID	0·2505	0·2514	0·2502	0·0035
	BOLT	OD	0·2489	0·2495	0·2485	
13	ROD END	ID	0·2497	0·2500	0·2505	0·0020
	BOLT	OD	0·2489	0·2495	0·2485	
14	LEVER	ID	0·2505	0·2514	0·2520	0·0035
	BOLT	OD	0·2489	0·2495	0·2485	
15	BEARING	ID	0·2497	0·2500	0·2505	0·0020
	BOLT	OD	0·2489	0·2495	0·2485	
16	LEVER	—	—	—	—	0·0160 END FLOAT
	SUPPORT	—	—	—	—	
17	BUSH	—	—	—	—	LIGHT TIGHT FIT
	LEVER	—	—	—	—	
18	BUSH	ID	0·5503	0·5530	0·5535	0·0070
	PILLAR	OD	0·5480	0·5490	0·5465	
19	PILLAR	ID	0·2505	0·2514	0·2520	0·0035
	BOLT	OD	0·2489	0·2495	0·2485	

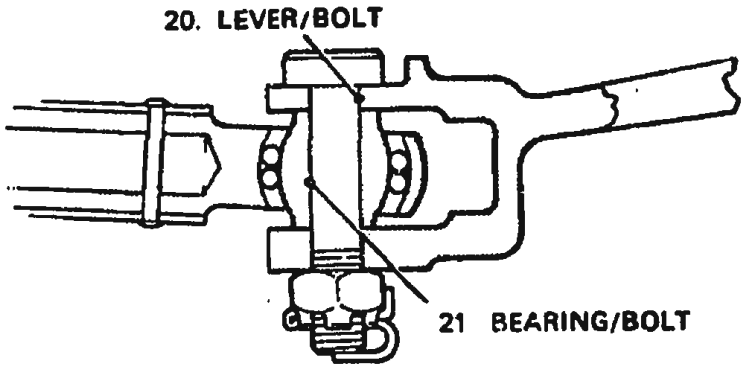
SECTION E-E (Continued from Sheet 6)

M1-0101-78-606
30442

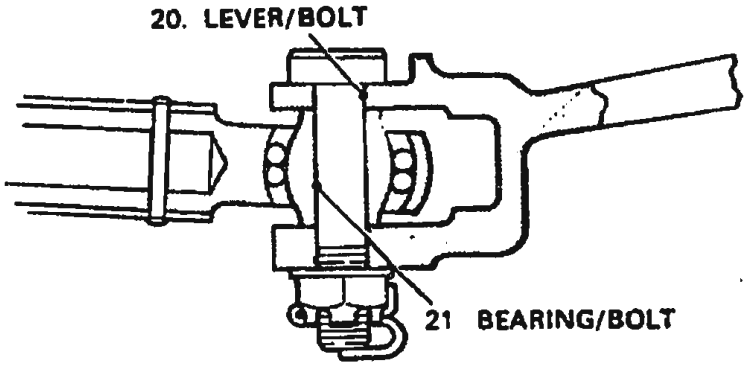
Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 7)

EFFECTIVITY: ALL

001B



ENGINES INCORPORATING S B. 76-2675
BUT NOT INCORPORATING S.B. 76-2207



ENGINES INCORPORATING S.B. 76-2207

SECTION F-F

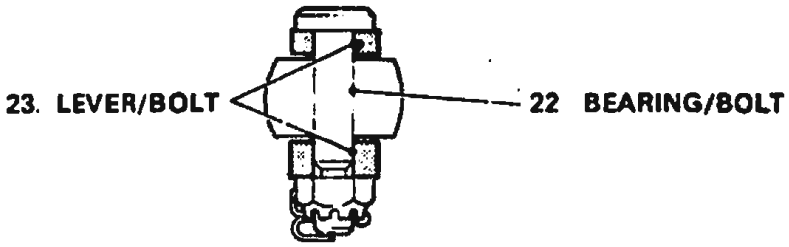
ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX. WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
20	LEVER	ID	0·2505	0·2514	0·2520	0·0035
	BOLT	OD	0·2489	0·2495	0·2485	
21	BEARING	ID	0·2497	0·2500	0·2505	0·0020
	BOLT	OD	0·2489	0·2495	0·2485	

M1-0101-76-607
25550A

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 8)

EFFECTIVITY: ALL

001B

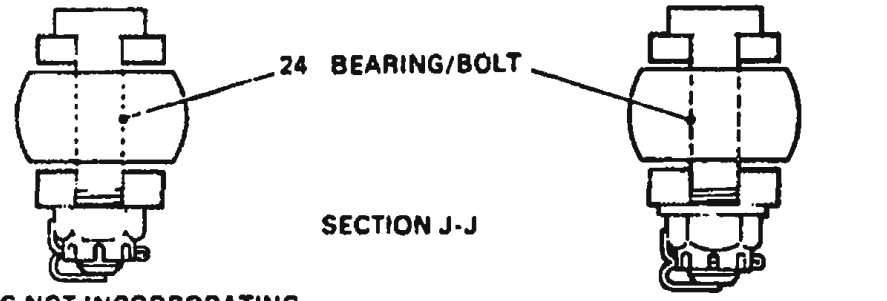


SECTION G-G

ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
22	BEARING	ID	0·2497	0·2500	0·2505	0·0020
	BOLT	OD	0·2489	0·2495	0·2485	
23	LEVER	ID	0·2505	0·2514	0·2520	0·0035
	BOLT	OD	0·2489	0·2495	0·2485	

M1-0101-76-608
25551A

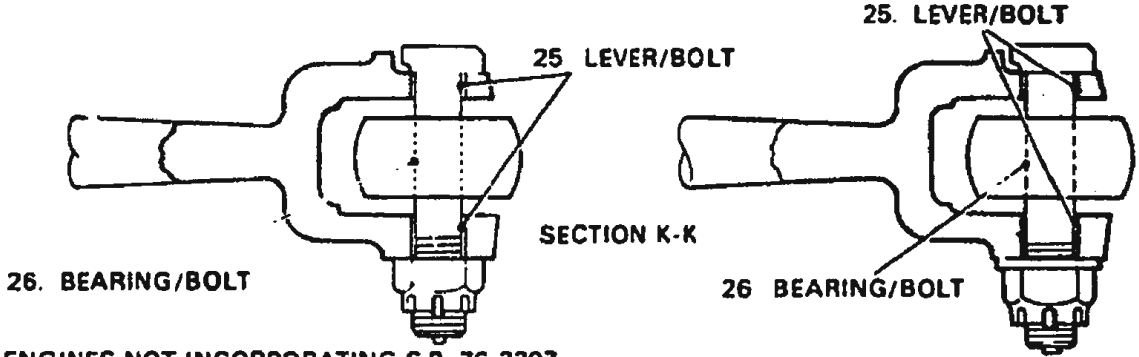
Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 9)



ENGINES NOT INCORPORATING S B. 76-2207

ENGINES INCORPORATING S.B. 76-2207

ITEM No	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
24	BEARING	ID	0·2497	0·2500	0·2505	0·0020
	BOLT	OD	0 2489	0·2495	0·2485	



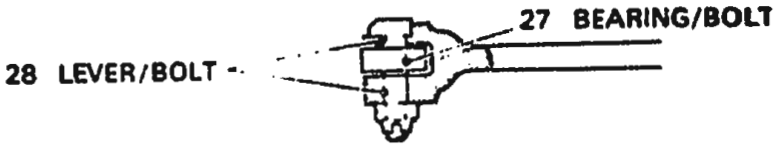
ENGINES NOT INCORPORATING S.B 76-2207

ENGINES INCORPORATING S B. 76-2207

ITEM No	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN	MAX.		
25	LEVER	ID	0 2505	0 2514	0·2520	0·0035
	BOLT	OD	0 2489	0·2495	0·2485	
26	BEARING	ID	0 2497	0 2500	0·2505	0·0020
	BOLT	OD	0 2489	0·2495	0·2485	

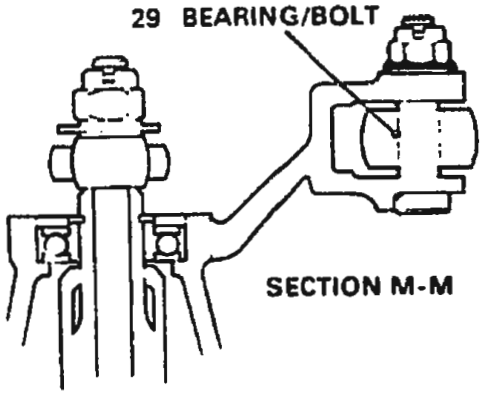
M1-0101-76-609
25552A

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 10)



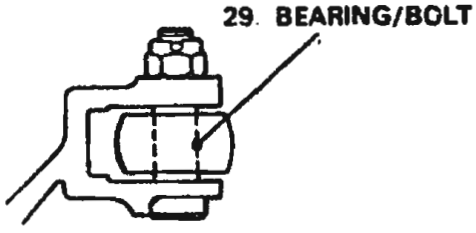
SECTION L-L

ITEM No	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
27	BEARING	ID	0·1895	0·1900	0·1900	0·0015
	BOLT	OD	0·1891	0·1896	0·1885	
28	LEVER	ID	0·1904	0·1911	0·1915	0·0030
	BOLT	OD	0·1891	0·1896	0·1885	



SECTION M-M

ENGINES INCORPORATING S B. 76-2496

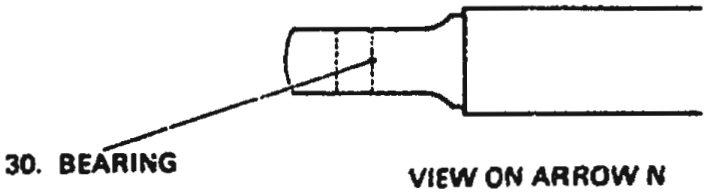


ENGINES NOT INCORPORATING S.B. 76-2496

ITEM No	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
29	BEARING	ID	0·2497	0·2500	0·2505	0·0020
	BOLT	OD	0·2489	0·2495	0·2485	

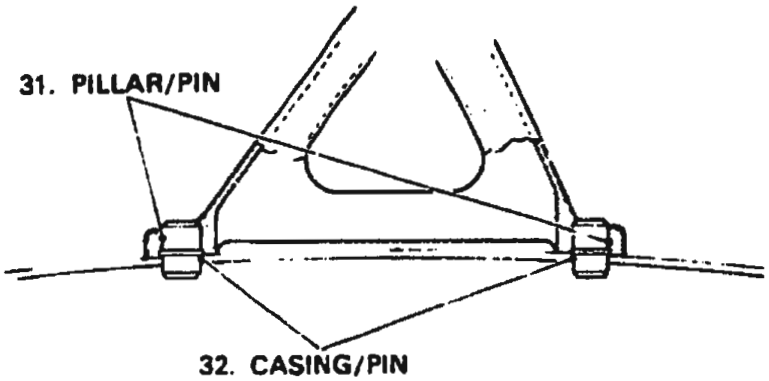
M1-0101-76-610
25553A

Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 11)



VIEW ON ARROW N

ITEM No.	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
30	BEARING	ID	0·2497	0·2500	0·2505	—



SECTION P-P

ITEM No	DESCRIPTION	DIM.	REFERENCE DIMENSION		WEAR LIMITS	
			DIAMETER		MAX WEAR DIM	MAX. DIA. CLEARANCE
			MIN.	MAX.		
31	PILLAR	ID	0·3932	0·3943	—	
	PIN	OD	0 3943	0·3949	—	
32	CASING	ID	0 3969	0·3983	0·3995	0·0060
	PIN	OD	0 3943	0·3949	0·3935	

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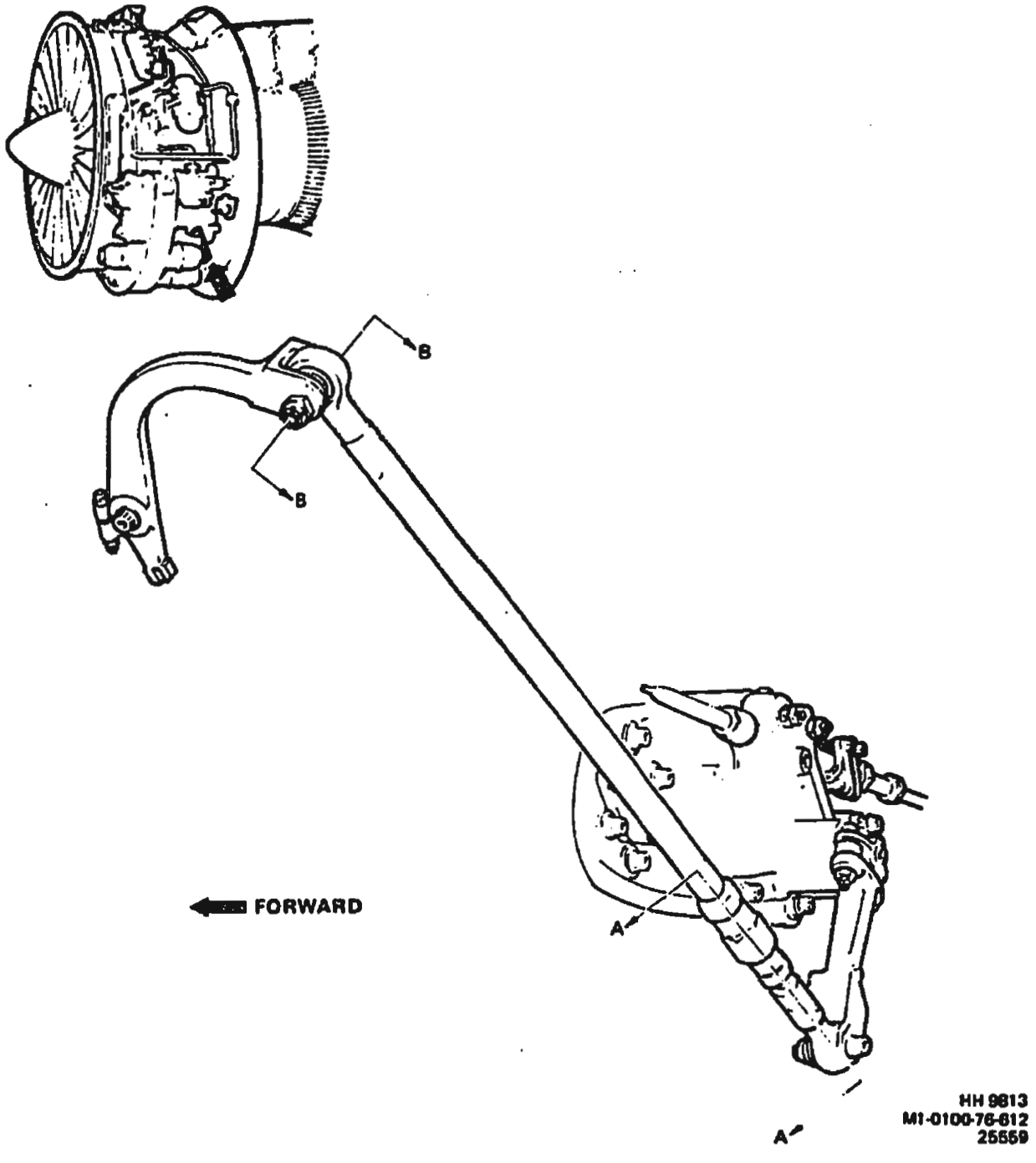
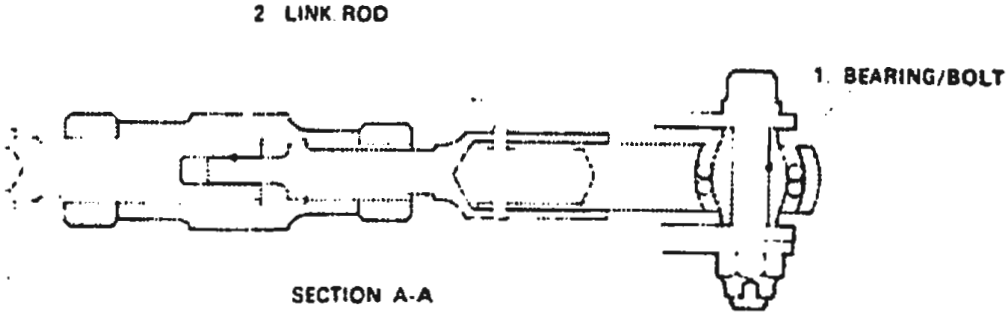
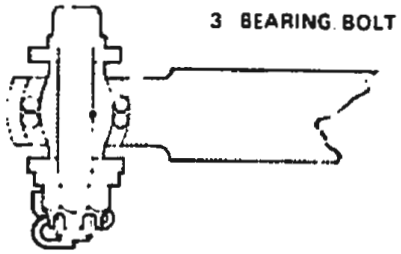
Engine Power and Thrust Reverser Mixing Mechanism Assembly
Linkage Wear Limits
Figure 601 (Sheet 12)



Engine Power and Thrust Reverser Fuel Flow Regulator Box
Linkage Wear Limits
Figure 602 (Sheet 1)



ITEM No	DESCRIPTION	DIM	REFERENCE DIMENSION DIAMETER MIN	REFERENCE DIMENSION DIAMETER MAX	WEAR LIMITS MAX WEAR DIM	WEAR LIMITS MAX DIA CLEARANCE
1	BEARING	ID	0 2497	0 2500	0 2505	0 0020
	BOLT	OD	0 2489	0 2495	0 2485	
2	LINK	SLOT WIDTH	0 1570	0 1600	0 1610	0 0070
	ROD	WIDTH	0 1551	0 1559	0 1540	



ITEM No	DESCRIPTION	DIM	REFERENCE DIMENSION DIAMETER MIN	REFERENCE DIMENSION DIAMETER MAX	WEAR LIMITS MAX WEAR DIM	WEAR LIMITS MAX DIA CLEARANCE
3	BEARING	ID	0 2497	0 2500	0·2505	0 0020 ·
	BOLT	OD	0 2489	0 2495	0 2485	

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Engine Power and Thrust Reverser Fuel Flow Regulator Box
Linkage Wear Limits
Figure 602 (Sheet 2)

EFFECTIVITY: ALL

001B

(b) On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable THRUST REVERSE circuit breaker (H16, H17, or H18).

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable START AIR circuit breaker (N3, N9, or N15).

(c) Open LH hinged cowl 413A or 423A for engines No. 1 or 3 (Ref. 71-11-00) or LH upper hinged cowl 433DL and LH lower hinged cowl 433AL for engine No. 2 (Ref. 71-12-00).

(d) Remove attaching hardware that secures the control rod to the balk lever and move the control rod clear of balk lever (Ref. Fig. 603).

(e) On pilots center control pedestal, zone 210, move applicable engine power control lever fully forward and ensure controls are free to move.

(f) Verify that fuel flow regulator air throttle lever touches the forward thrust stop (Ref. Fig. 603).

(g) Move the engine power control lever fully aft (idle).

(h) Manually move the balk lever (Ref. Fig. 603).

(i) On pilots enter control pedestal, move applicable reverse thrust control lever to full reverse position and ensure controls are free to move.

(j) Verify that fuel flow regulator air throttle lever (Ref. Fig. 603) touches the reverse thrust stop.

(k) Manually return balk lever to original position prior to Step (h).

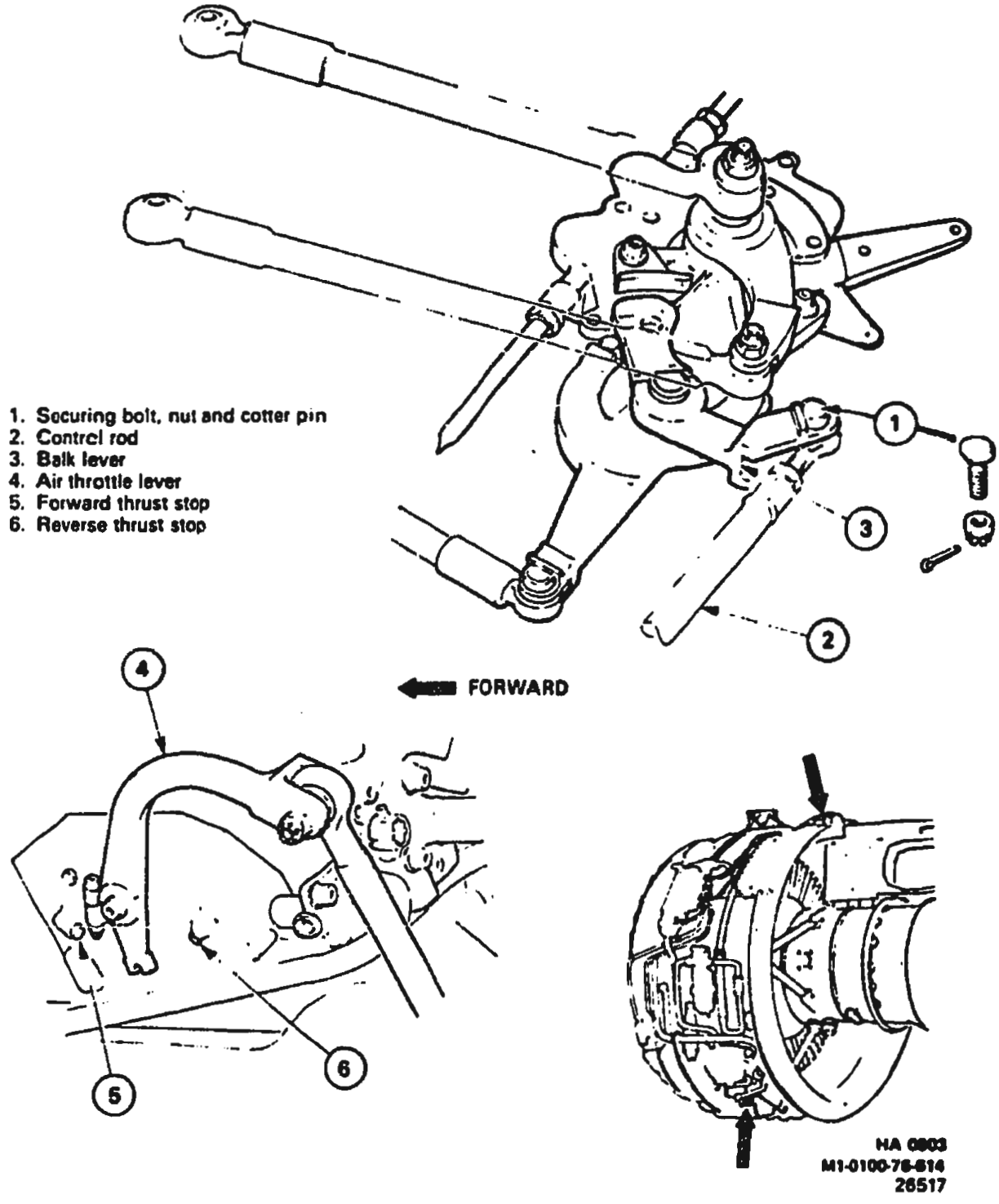
(l) Move the reverse thrust control lever fully forward.

(m) Install control rod to balk lever with attaching hardware.

(n) Close applicable hinged cowl opened in Step (c).

(o) Remove tags and close circuit breakers opened in Step (b).

(p) Remove tag installed in Step (a).



Engine Controls Movement Range
Figure 603

3. Control Cable and F.F.R. Box

A. Check Control Cable and F.F.R. Box Rack Dovetails for Wear

(1) Equipment Required:

ERE5229 (Teleflex GA2074) Dovetail disconnect wear gauge

(2) Tag appropriate APU/GRD AIR TO REVERSERS switch.

(3) On pilots overhead circuit breaker panel CB1, zone 210, open and tag appropriate THRUST REVERSER circuit breaker.

(4) On Flight Engineers/Second Officers aft circuit breaker panel CB3, zone 215, open and tag appropriate START AIR VALVE circuit breaker.

(5) Tag appropriate ENGINE START panel switch light.

(6) Open left-hand hinged cowl 413A or 423A and right-hand hinged cowl 414A or 424A (Ref. 71-11-00) for engines No. 1 and No. 3 and 433AL or 434AR (Ref. 71-12-01) for engine No. 2.

(7) Refer to Figure 604, remove cotter pin, nut, washer and bolt (1).

(8) Remove clamp assembly (2).

R CAUTION: ENSURE NO BENDING LOADS ARE APPLIED TO DOVETAIL
R JOINTS.

(9) Using feeler gauge, check gap between F.F.R. rack dovetail and cable dovetail when engaged does not exceed 0.010 in. (0.25mm.).

Alternatively, disconnect terminal (3) then using both ends of wear gauge GA2074 ("NO-GO" gauge) check cable dovetail and F.F.R. rack dovetail. If either end of wear gauge can be engaged wear is above acceptable limit and either F.F.R. box and/or cable must be changed (Ref. 76-11-02).

B. Check F.F.R. Box Gear Sector and Rack Teeth for Wear

(1) Equipment Required:

ERE5228 (Teleflex GA2069) Wear Gauge and fixture

(2) Refer to Figure 604, with terminal (3) disconnected remove F.F.R. box connector (4).

(3) Move F.F.R. box output lever clockwise to expose a section of rack.

(4) Visually check teeth of exposed section of rack for excessive wear.

NOTE: Maximum wear occurs on teeth which are engaged during cruise, i.e., between third and thirteenth teeth from dovetail end of rack.

R R Slight wear is acceptable subject to checks carried out in Paragraph 3B(6).

R (5) Fit and secure F.F.R. box connector (4) then wirelock.

R (6) Refer to Figure 605, fit wear gauge and fixture GA2069.

(a) Move F.F.R. box output lever clockwise to extend rack from housing.

(b) Engage dovetail disconnects of F.F.R. box rack and wear gauge then move F.F.R. box output lever anti-clockwise to retract rack.

(c) Lock wear gauge in position by engaging lever with F.F.R. box connector.

(d) Ensure thumb screws (1), (2) and (3) are approximately flush with inner surface of fixture.

(e) Fit fixture to F.F.R. box and engage locating dowel (4) in rig pin hole, ensure positive and full location of dowel (4).

(f) Lightly tighten thumb screw (1) to abut F.F.R. box.

CAUTION: ENSURE THUMB SCREW (1) IS NOT OVERTIGHTENED OR DAMAGE TO F.F.R. BOX WILL OCCUR.

(g) Push F.F.R. box output lever in clockwise direction and hold in position.

(h) Tighten torque limiting screws (2) and (3) to lock lever in place.

(j) Rotate gauge lever to unlock position, allow spring pressure in wear gauge to lift gauge from F.F.R. connector face.

(k) Rotate gauge lever to wear check position. If lever contacts F.F.R. box connector flange and not connector throat, wear has exceeded acceptable limits and F.F.R. box must be changed (Ref. 76-11-02).

R NOTE: The handle portion of the gauge locking
R lever is a go, no-go gauge.

(l) Remove wear gauge and fixture.

C. Check Clamp Cavity for Wear

(1) Equipment Required:

ERE5230 (Teleflex GA2165) Clamp cavity wear gauge (2 off)

(2) Refer to Figure 604, position gauge GA2165 in each clamp (2) cavity then close clamp (2) and torque tighten screws to between 25 and 32 lb. in. (2.82 and 3.62 Nm.).

(3) If either of gauges are loose, the clamp cavities are worn beyond acceptable limits and clamp (2) must be changed.

CAUTION: ENSURE NO BENDING LOADS ARE APPLIED TO DOVETAIL JOINTS.

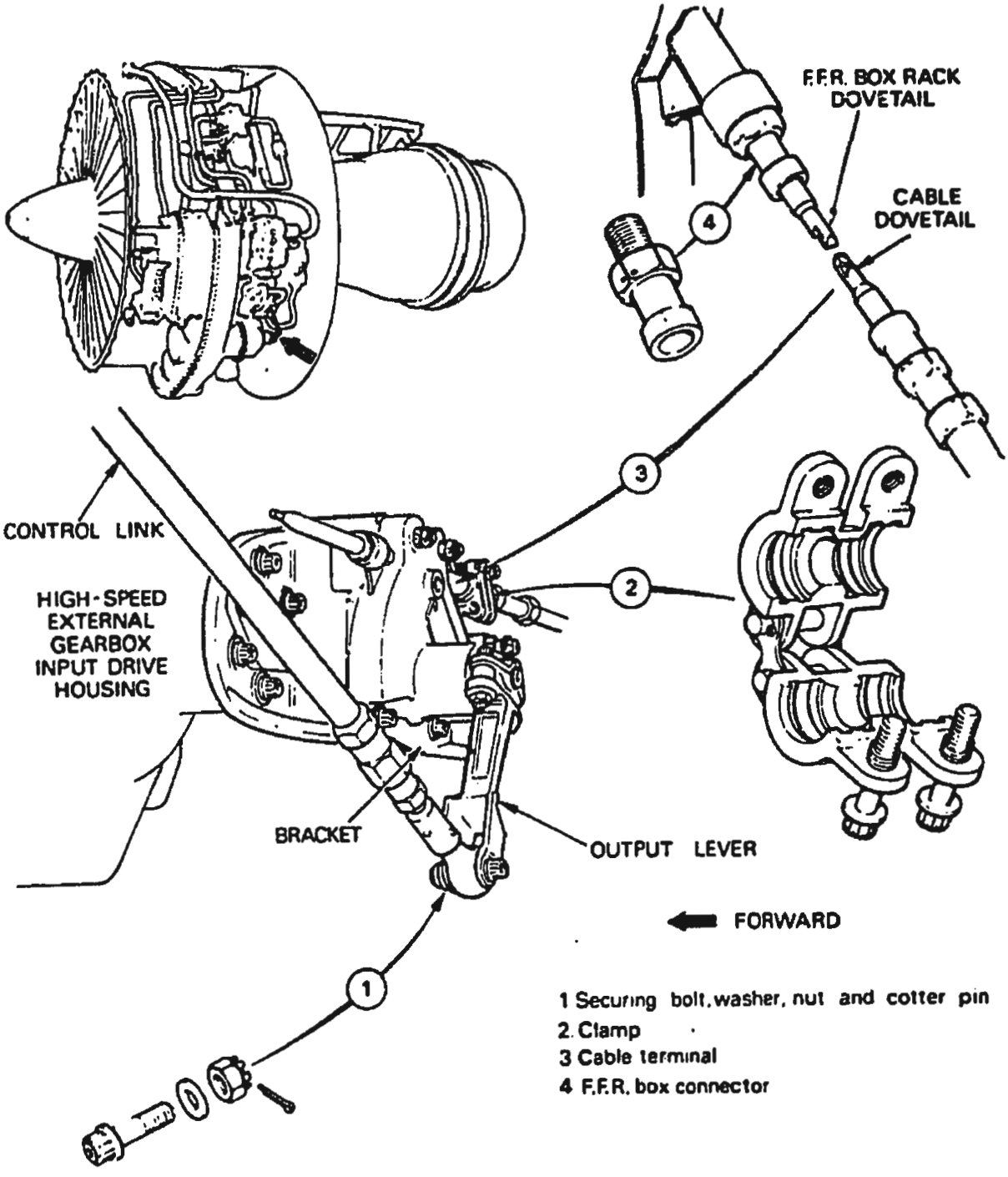
D. Refer to Figure 604, connect cable terminal (3) then fit and secure clamp (2), torque tighten screws to between 25 and 32 lb. in. (2.82 and 3.62Nm.) and wirelock.

E. Correctly locate control link in fork end of F.F.R. box output lever and secure with bolt, washer, nut and new cotter pin (1).

F. Set engine power control linkage (Ref. 76-11-00).

G. Close left-hand hinged cowl 413A or 423A and right-hand hinged cowl 414A or 424A (Ref. 71-11-00) for engines No. 1 and No. 3 and 433AL or 434AR (Ref. 71-12-01) for engine No. 2.

H. Remove tags and close circuit breakers opened in Step A(2) through (5).



1 Securing bolt, washer, nut and cotter pin
2. Clamp
3 Cable terminal
4 F.F.R. box connector

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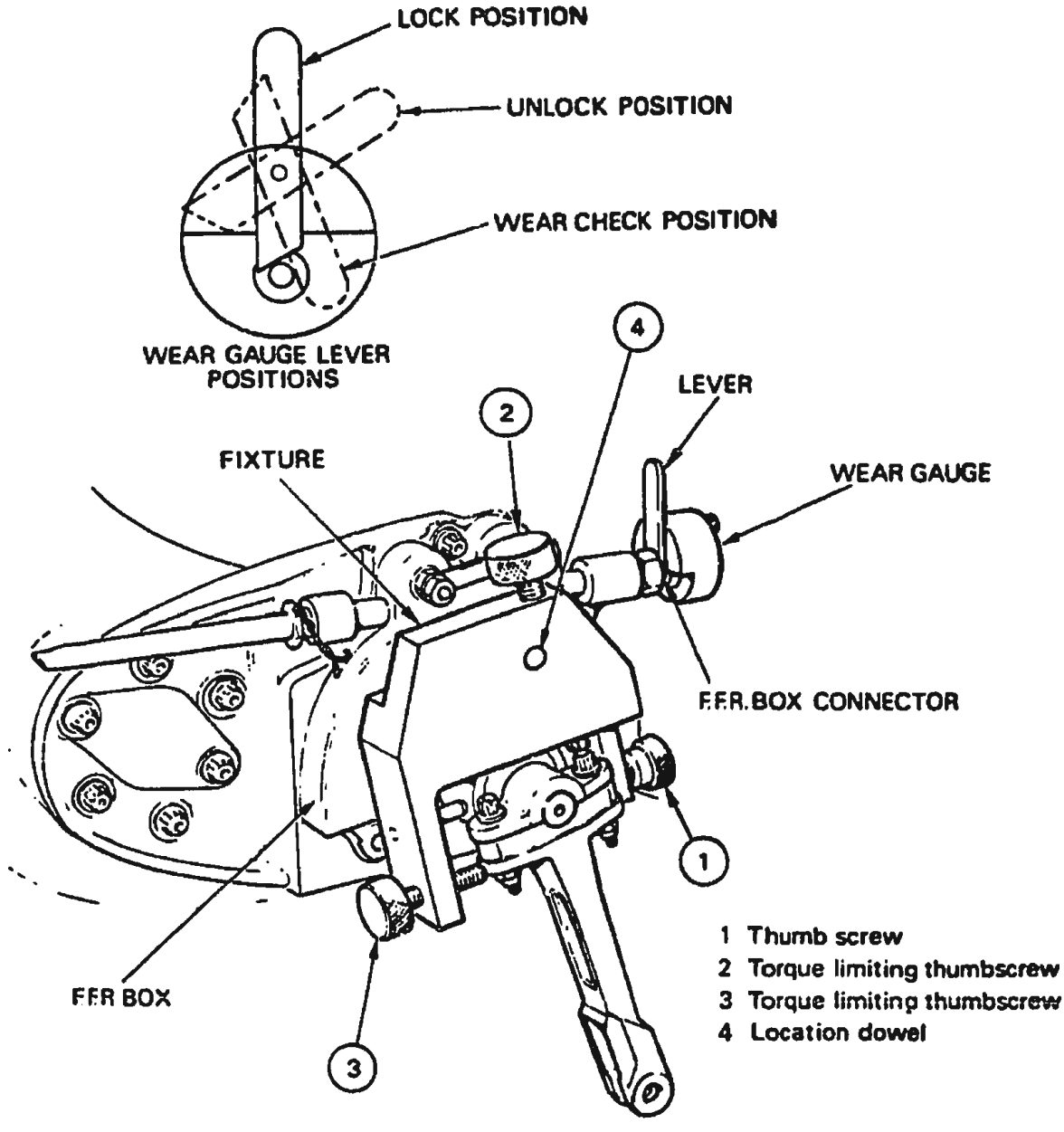
R F.F.R. Box and Control Cable Disconnect Points
R Figure 604

R EFFECTIVITY: ALL
R
001 B



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R F. F.R. Box Rack Wear Gauge and Fixture - Removal and Installation
R Figure 605

R EFFECTIVITY: ALL
R
001 B

THROTTLE CABLE TENSION REGULATOR ASSEMBLY REMOVAL AND INSTALLATION

1. General

The removal and installation procedure is identical for left and right pylon-mounted throttle cable tension regulator assemblies. Differences for engine No. 2 are indicated.

2. Equipment and Materials

R Cotter Pin, PN MS24665-153, or equivalent

Engine Power Control Rigging Kit, PN B996, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Prop Block, Pacific Scientific Company, PN 0501750-10, or equivalent

Warning Tag, Pacific Scientific Company, PN 0501750-90, or equivalent

3. Referenced Procedure

R	6-40-00	Exterior Access Door and Panels
R	71-11-00	Engines No. 1 and No. 3 Cowling - Servicing
R	71-12-01	LH and RH Lower Hinged Cowls - Servicing
	76-11-00	Engine Control System - Adjustment and Test

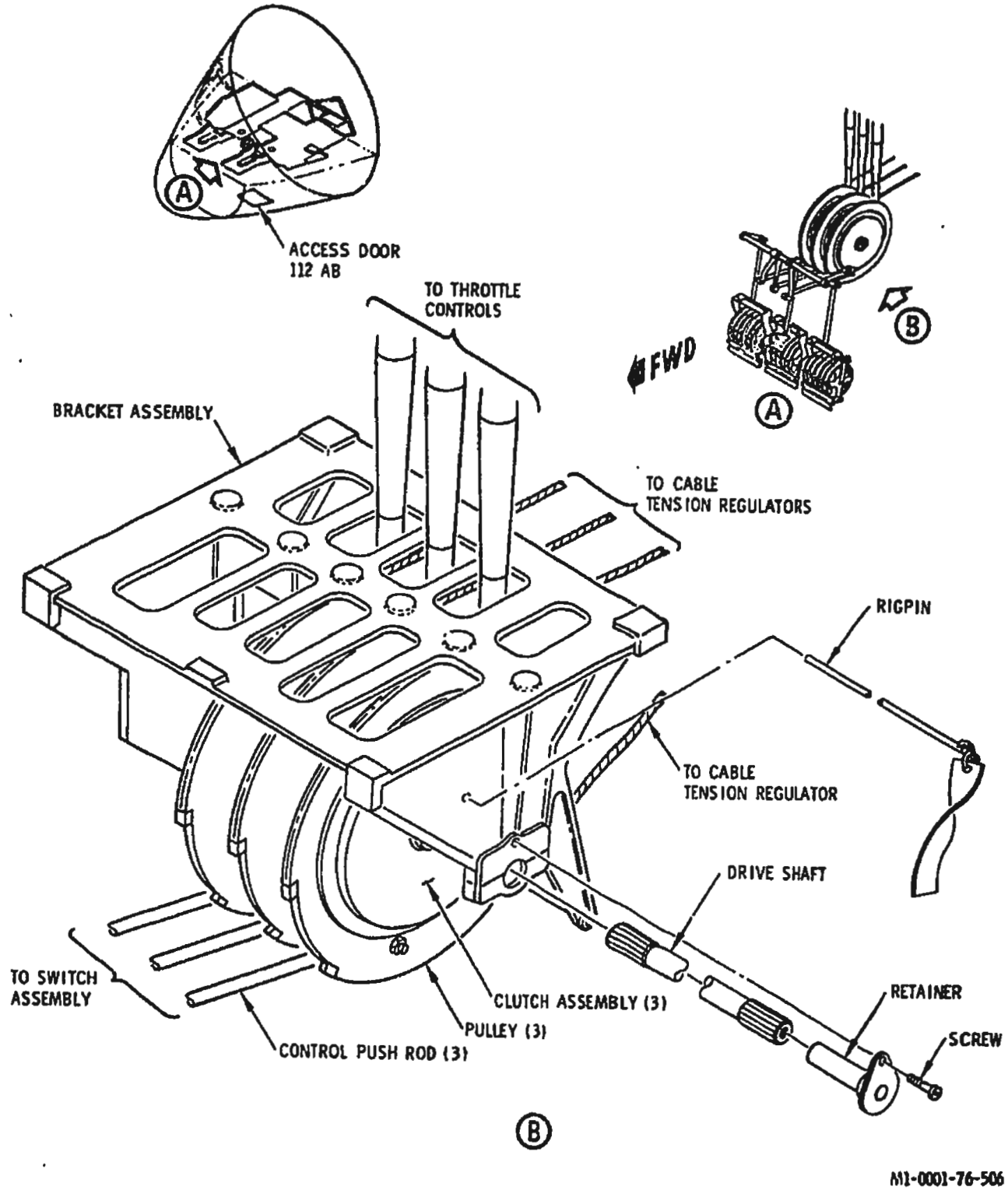
4. Removal/Installation

A. Removal

(1) Check that power control levers and reverse thrust levers, zone 210, are in idle position. Tag power control levers and reverse thrust levers.

(2) In the forward electronic service center, zone 112, insert rig pin (Ref. Fig. 401) in the autothrottle clutch assembly.

R (3) On wing engines, remove applicable pylon nose fairings
R forward panel, 452AT or 462AT, zone 451 or 461. On



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R Autothrottle Clutch Assembly Rig Pin
R Figure 401

center engine, open access panel 471AR, zone 471 (Ref. 6-40-00).

(4) On wing engines, open applicable engine LH or RH hinged cowl, zone 413 or 423, and 414 or 424 (Ref. 71-11-00). On center engine, open LH cowl, zone 433 (Ref. 71-12-01).

(5) Remove lever from tension regulator splined shaft.

(6) On wing engines, remove tension regulator cover assembly.

R (7) Remove cable guard pins.

R (8) Pull back evenly on power advance (PA) and power retard (PR) cables at the same time (Ref. Fig. 402 and 403).

R (9) Insert prop block on tension regulator lockshaft to
R block the crosshead (Ref. Fig. 404).

R (10) Remove PA cable from tension regulator. Tie cable to
R prevent cable slack.

R (11) Remove PR cable from tension regulator.

R (12) Remove three tension regulation assembly installation bolts and remove assembly.

B. Installation

(1) Place throttle cable tension regulator assembly, with splined shaft facing up, into support brackets and secure with three installation bolts.

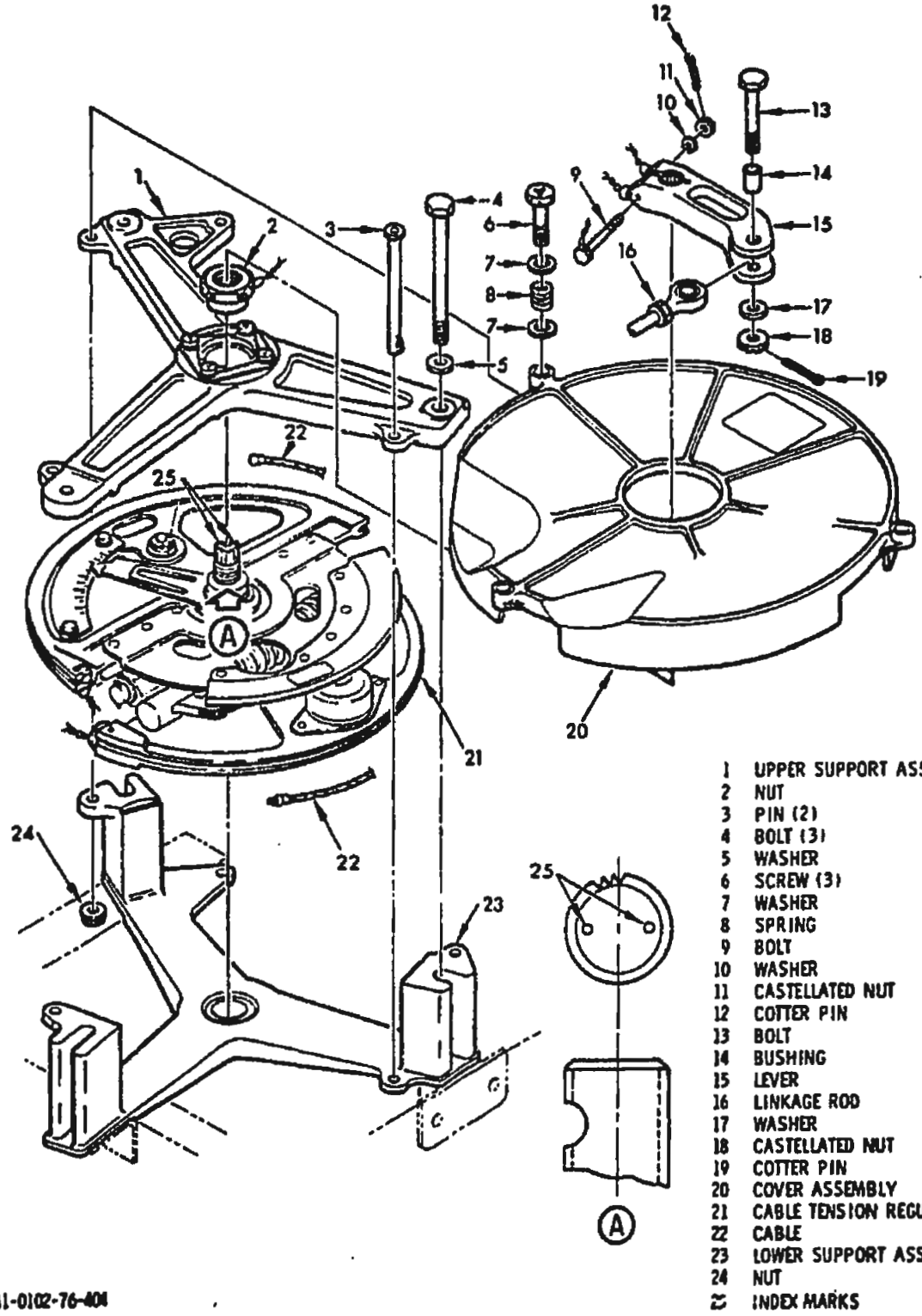
R NOTE: On aircraft 001-032 with SB76-013 and 033-036,
R on wing engines only, ensure shims are still
R bonded to upper support assembly and
R interference fit washer is in place on spline
R shaft (Ref. Fig. 402).

(2) Install PR cable on throttle cable tension regulator.

(3) Install PA cable on throttle cable tension regulator.

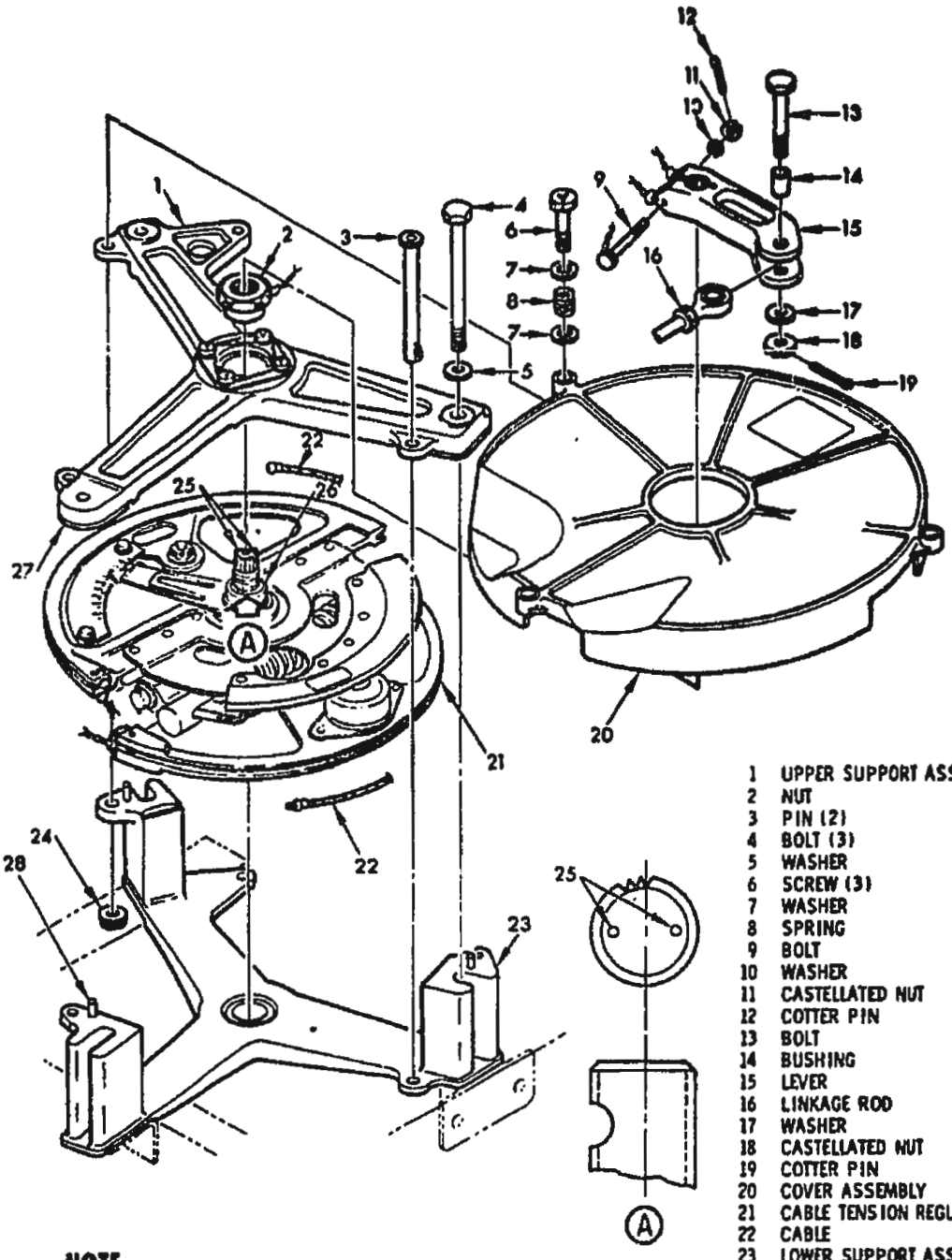
(4) Grasp PR and PA cables, and gently pull back on both cables evenly. Remove prop block from throttle cable tension regulator lockshaft and gently release pressure on both cables evenly.

(5) Check that throttle cable tension regulator takes up slack in forward and reverse thrust cables.



1 UPPER SUPPORT ASSEMBLY
2 NUT
3 PIN (2)
4 BOLT (3)
5 WASHER
6 SCREW (3)
7 WASHER
8 SPRING
9 BOLT
10 WASHER
11 CASTELLATED NUT
12 COTTER PIN
13 BOLT
14 BUSHING
15 LEVER
16 LINKAGE ROD
17 WASHER
18 CASTELLATED NUT
19 COTTER PIN
20 COVER ASSEMBLY
21 CABLE TENSION REGULATOR
22 CABLE
23 LOWER SUPPORT ASSEMBLY
24 NUT
25 INDEX MARKS

Throttle Cable Tension Regulator Assembly
Wing Engines Removal and Installation
Figure 402



1	UPPER SUPPORT ASSEMBLY
2	NUT
3	PIN (2)
4	BOLT (3)
5	WASHER
6	SCREW (3)
7	WASHER
8	SPRING
9	BOLT
10	WASHER
11	CASTELLATED NUT
12	COTTER PIN
13	BOLT
14	BUSHING
15	LEVER
16	LINKAGE ROD
17	WASHER
18	CASTELLATED NUT
19	COTTER PIN
20	COVER ASSEMBLY
21	CABLE TENSION REGULATOR
22	CABLE
23	LOWER SUPPORT ASSEMBLY
24	NUT
25	INDEX MARKS
26	WASHER (1)
27	SHIM (3) (1)
28	DOWEL PIN (3) (1) (2)

NOTE

(1) USED ON AIRCRAFT WITH SB 76-013

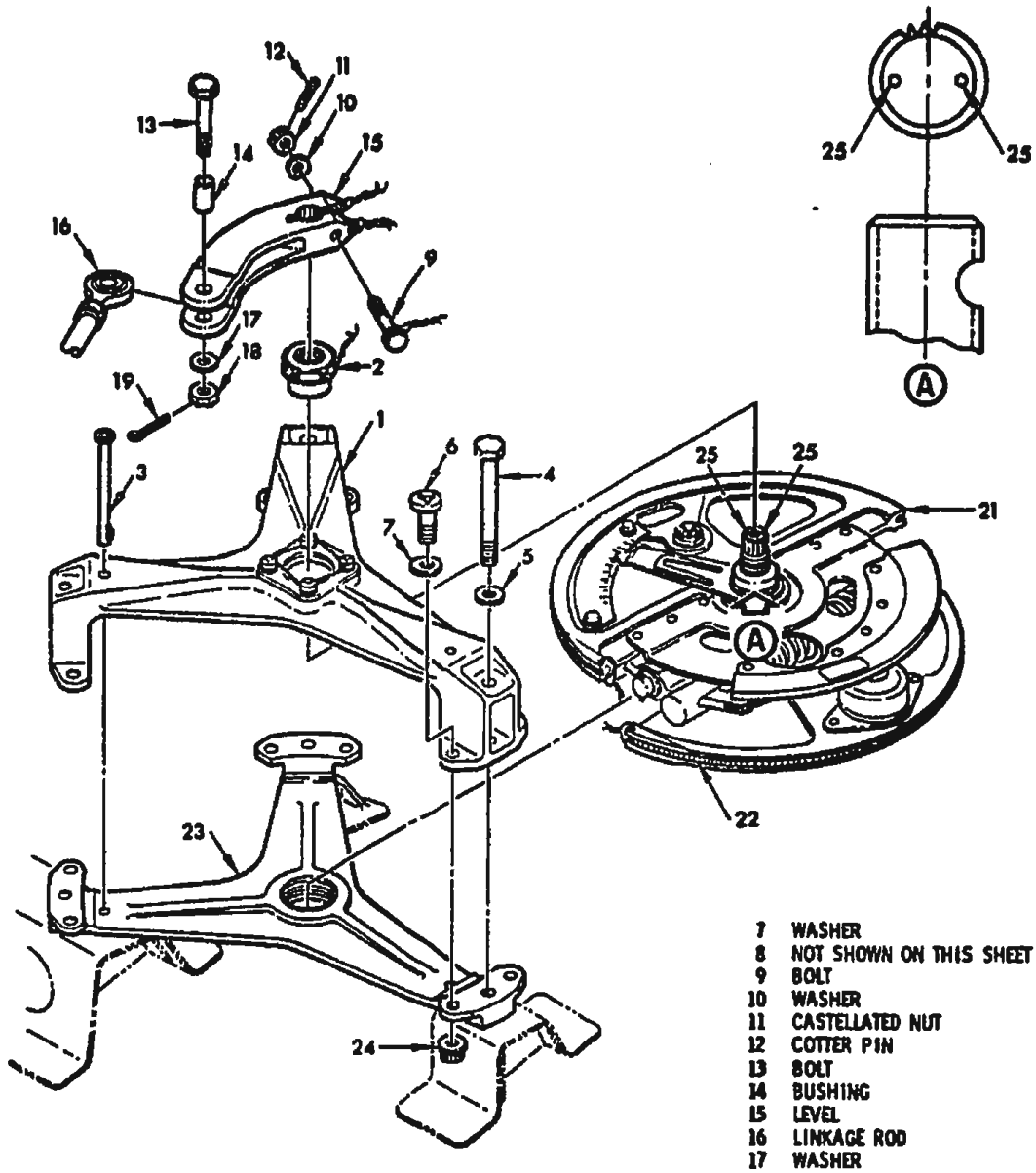
(2) USED ON AIRCRAFT WITH LOWER SUPPORT ASSEMBLY PN 1545317-101 ONLY

M1-0001-76-631

R Throttle Cable Tension Regulator Assembly
R Wing Engines Removal and Installation
R Figure 402

EFFECTIVITY: 001-032 WITH SB76-013 AND 033-036

001B



1 UPPER SUPPORT ASSEMBLY
2 NUT
3 PIN (2)
4 BOLT (3)
5 WASHER
6 SCREW (6)
7 WASHER
8 NOT SHOWN ON THIS SHEET
9 BOLT
10 WASHER
11 CASTELLATED NUT
12 COTTER PIN
13 BOLT
14 BUSHING
15 LEVEL
16 LINKAGE ROD
17 WASHER
18 CASTELLATED NUT
19 COTTER PIN
20 NOT SHOWN ON THIS SHEET
21 CABLE TENSION REGULATOR
22 CABLE
23 LOWER SUPPORT ASSEMBLY
24 NUT
25 INDEX MARKS

M1-0102-76-405

Throttle Cable Tension Regulator Assembly
Center Engine Removal and Installation
Figure 403

(6) Install lock-wire for cable retention and install cable guard pins.

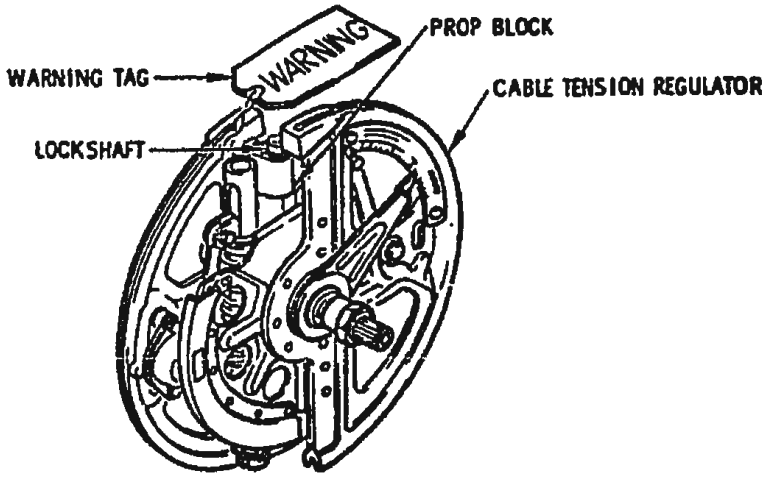
(7) On wing engines, install tension regulator cover assembly.

(8) Install lever on throttle cable tension regulator splined shaft aligning slot mark in lever with two index dots on top of splined shaft. Slide bolt along splined shaft notch. Secure with washer, castellated nut, cotter pin, and lock-wire. Secure nut on regulator shaft to lever with lock-wire.

(9) Check that cable tension regulator and cables operate smoothly. Perform engine control system adjustment and test (Ref. 76-11-00).

(10) On wing engines, close LH or RH hinged cowl, zone 413 or 423 (Ref. 71-11-00). On center engine, close LH cowl, zone 433 (Ref. 71-12-01).

(11) On wing engines, install pylon nose fairing forward panel 452AT or 462AT, zone 451 or 461. On center engine, install access panel 471AR, zone 471 (Ref. 6-40-00).



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Prop Block Installation
Figure 404

THROTTLE CONTROL SWITCH (GROUND IDLE SWITCH) REMOVAL AND INSTALLATION

1. General

The engine power control position switches, grouped in three identical sections and controlled by reel-type cams, are located below the autothrottle clutch assemblies in the forward electronic service center, zone 112.

2. Referenced Procedures

20-24-02	Crimped Electrical Contact - Removal and Installation
34-44-01	Weather Radar Receiver - Transmitter - Removal and Installation
76-11-06	Throttle Control Switch - Adjustment and Test

3. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker AVIONICS FLIGHT CONTROL SYSTEM - AUTO THROT SERVO.

On Flight Engineer/Second Officer aft circuit breaker panel CB3, zone 215, open and tag circuit breaker ENG IDLE.

(2) Open access door 112AB.

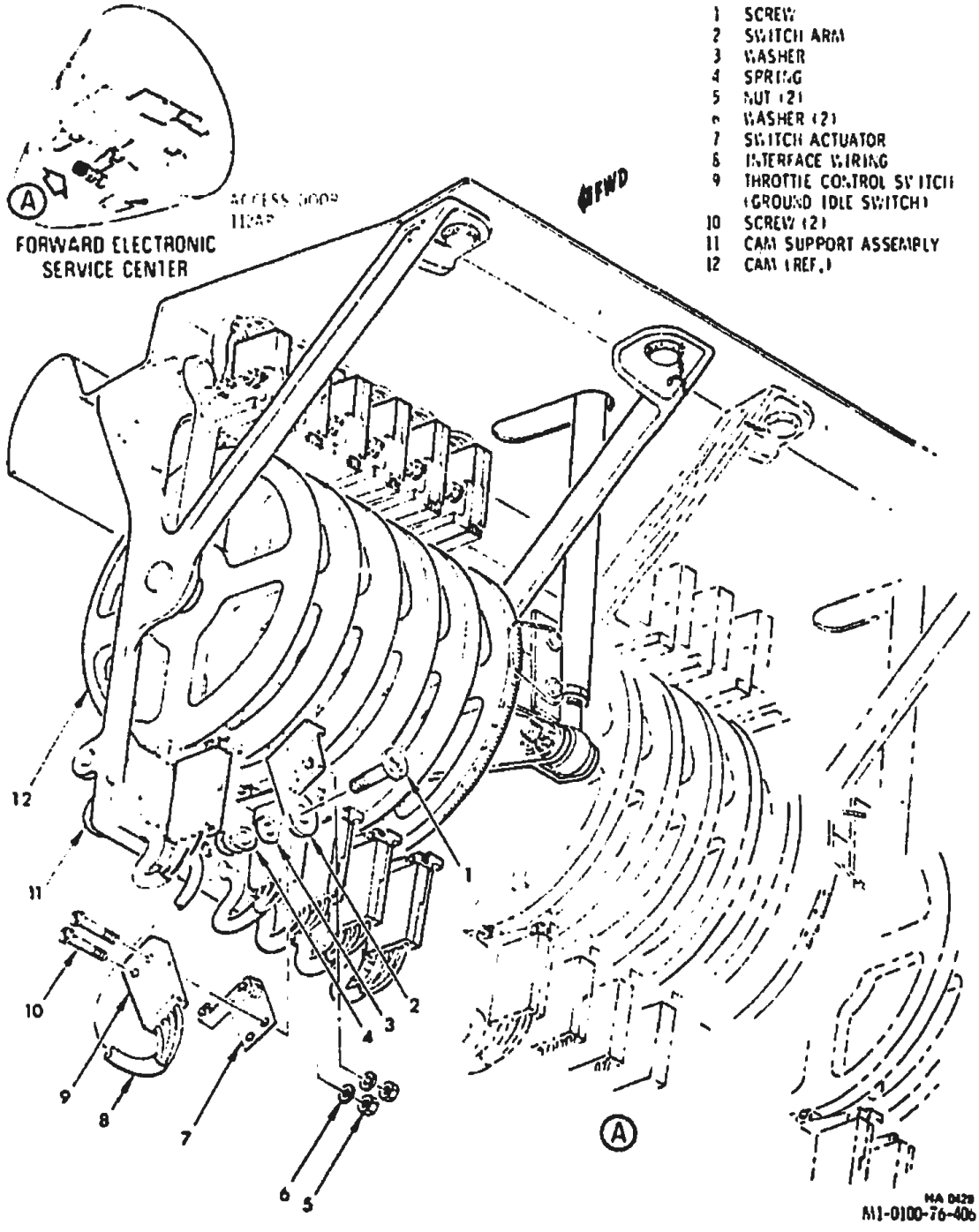
(3) Remove weather radar receiver-transmitters No. 1 and No. 2 from top shelf of forward electronic service center forward rack (Ref. 34-44-01).

(4) Remove drip shield from top of forward rack.

R WARNING: ENSURE THAT ENGINE POWER CONTROL LEVERS ARE NOT OPERATED DURING SWITCH REMOVAL.

(5) Release switch arm from can support assembly by removing screw, spring, and washer (Ref. Fig. 401).

(6) Rotate switch arm to provide access to switch attaching hardware.



Throttle Control Switch (Ground Idle Switch)
Removal and Installation
Figure 401

(7) Remove screws, nuts, and washers to separate switch from switch arm.

NOTE: Switch actuator is attached with same hardware as switch, and comes off when switch is separated. Retain for installation.

(8) Tag and disconnect wires from switch (Ref. 20-24-02).

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

R WARNING: ENSURE THAT ENGINE POWER CONTROL LEVERS ARE NOT OPERATED DURING SWITCH INSTALLATION.

(2) Connect wires to switch (Ref. 20-24-02) and remove wire tags.

(3) Orient and position switch actuator on switch arm with mounting holes aligned (Ref. Fig. 401).

(4) Secure switch and switch actuator with screws, washers, and nuts.

(5) Rotate switch arm back to cam support assembly and secure with screw, spring, and washer.

(6) Verify switch actuation and calibrate switch as necessary (Ref. 76-11-06).

(7) Install drip shield over forward rack.

(8) Install weather radar receiver-transmitters No. 1 and No. 2 on forward rack (Ref. 34-44-01).

(9) Close access door.

(10) Remove tags and close circuit breakers opened in Step 3A(1).

THROTTLE CONTROL SWITCH - ADJUSTMENT AND TEST

1. Equipment and Materials

   Throttle and Flap Switch Test Set, PN T-6017-TCT, or equivalent

   28V dc power source

2. Referenced Procedure

   76-11-00 Engine Control System - Adjustment and Test

3. Adjustment/Test

   A. Power Control Lever Switch

      (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers R AOA (F1) and T/O AURAL WARNING (H7).

      On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable circuit breaker START AIR VALVE (N3, N9, or N15).

      On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers AUTO THROTTLE SERVO (A1), SPEED CONT (A2), FCES - COMPUTERS - AC & L AOA (B5), and LANDING GEAR WARN HORN (L12).

      (2) Place applicable power control lever in idle position and tag.

      (3) Raise reverse thrust control levers (approximately 40 degrees) and return to fully down position.

      (4) Gain access to forward electronic service center through access door 112AB.

      (5) Verify that applicable power control lever switch module protractor indicates 42.5 (±0.5) degrees (Ref. Fig. 501). If not at 42.5 (±0.5) rig the complete system (Ref. 76-11-00).

      (6) Disconnect pushrod from applicable switch cam crank.

      (7) Disconnect applicable electrical connector located just forward of the switch module.

(8) Connect switch module plug to test set receptacle (Ref. Fig. 502).

(9) Connect test set plug to 28V dc power source.

NOTE: If test set is not available, use a continuity tester and verify pin continuity (Ref. Table 501).

(10) Manually rotate cams with switch cam crank from 0 to 90 degrees as measured by protractor (Ref. Fig. 501). Verify applicable switch continuity (Ref. Table 501) for degrees of cam rotation as indicated by test set lights (Ref. Fig. 502).

(11) Rotate cams from 90 to 0 degrees. Switch No. 11 must not actuate before protractor reads 39 degrees.

(12) Calibrate switches with adjustment screws (Ref. Fig. 501) if actuation angles are not set correctly.

NOTE: Verify that adjusting screw penetrates the insert to where it is flush or protrudes through the insert after adjustment.

(13) Disconnect test set from power source.

(14) Disconnect switch module electrical connector from test set.

(15) Connect switch module electrical connector to airplane connector.

(16) Rotate cam to 42.5 (±0.5) degree position as measured by protractor.

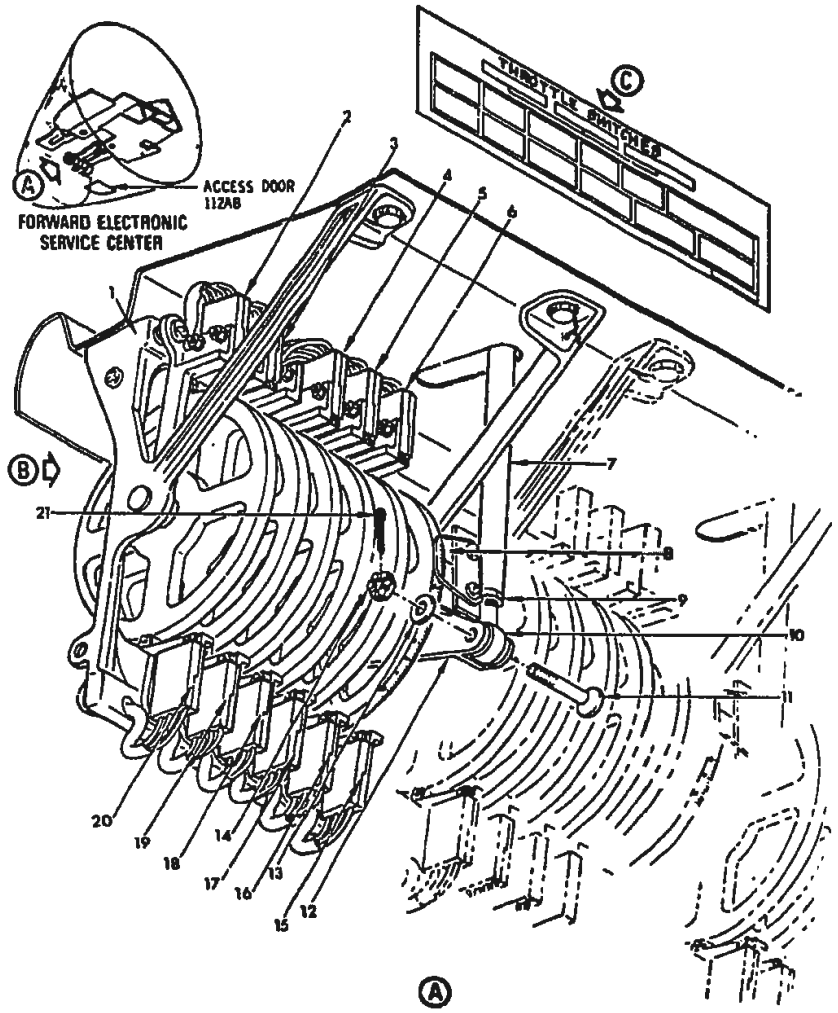
(17) Ensure that applicable power control lever is in idle position and connect power control lever pushrod to switch cam crank.

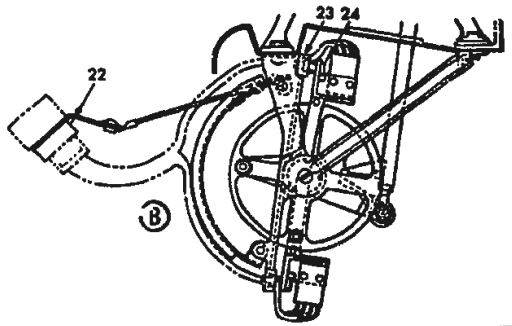
NOTE: Bolt connecting pushrod to cam crank must fit easily without moving cam or pushrod, or complete power control system must be rigged (Ref. 76-11-00).

(18) Remove any test equipment or tools from forward electronic service center and close access door.

(19) Remove tag from power control lever.

(20) Remove tags and close circuit breakers opened in Step 3A(1).





THROTTLE SWITCHES

ENGINE NO. 1	ENGINE NO. 2	ENGINE NO. 3

TO AURAL WRN 3318-S8	A/T DIS IDLE 2231-S2		RTO-SYS B 2217-S8	DLC-SYS A 2217-S6	A/T RVS THR INTLK 7611-S12
LDG GR HN SW 3261-S9	GRD IDLE 7611-S3	A/T MIN THR 2231-S1	DCL-SYS B 2217-S9	RTO-SYS A 2217-S7	ENG RVS TMR 7831-S5

818951

C

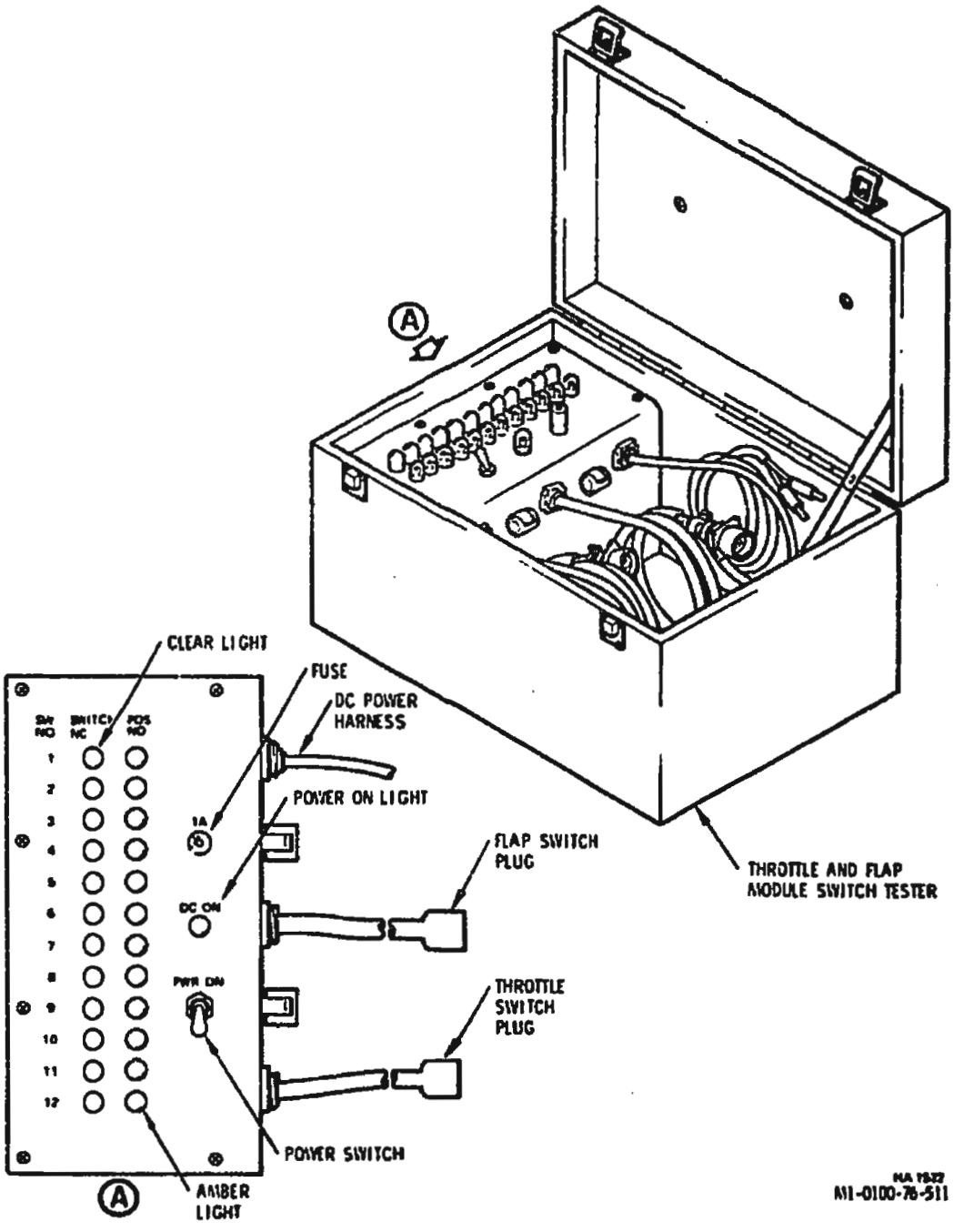
1 SWITCH MODULE (3)
2 TAKEOFF AURAL WARNING SWITCH (POSITION 2)
3 AUTO THROTTLE (A/T) IDLE DISCONNECT SWITCH (POSITION 4)
4 REJECT TAKEOFF (T/O) REVERSE THRUST AUTO GROUND SPOILER - SYSTEM B SWITCH (POSITION 8)
5 THRUST LESS THAN T/O AND GO-AROUND (G/A) DIRECT LIFT CONTROL - SYSTEM A SWITCH (POSITION 10)
6 A/T REVERSE THRUST INTERLOCK SWITCH (POSITION 12)
7 PUSH ROD ASSEMBLY (3)
8 PROTRACTOR
9 NUT
10 EYEBOLT
11 BOLT
12 SWITCH CAM CRANK (3)
13 WASHER
14 NUT
15 ENGINE REVERSE THRUST SWITCH (POSITION 11)
16 REJECT T/O REVERSE THRUST AUTO GROUND SPOILER - SYSTEM A SWITCH (POSITION 9)
17 THRUST LESS THAN T/O AND G/A DIRECT LIFT CONTROL - SYSTEM B SWITCH (POSITION 7)
18 AUTO THROTTLE MINIMUM THRUST SWITCH (POSITION 5)
19 GROUND IDLE SWITCH (POSITION 3)
20 LANDING GEAR WARNING HORN SWITCH (POSITION 1)
21 COTTER PIN
22 ELECTRICAL CONNECTOR
23 INSERT (12)
24 ADJUSTMENT SCREW (12)

M1-5000-76-512

Switch Rigging
Figure 501

EFFECTIVITY: ALL

001B



Throttle Switch Test Set
Figure 502

EFFECTIVITY: ALL

001B

SWITCH ACTUATION
TABLE 501

SWITCH NO.	PIN NO. CONTINUITY	CAM ROTATION IN DEGREES	
		CLEAR LIGHT	AMBER LIGHT
1	1-2	0-57	
	1-35		58-90
2	8-23	0-69	
	8-9		70-90
3	10-34	0-38 70-90	
	10-11		39-65
4	32-40	0-46	
	32-33		47-90
5	3-20	0-49	
	3-4		50-90
6			
7	28-29	0-75	
	28-37		76-90
8	30-31	0-38	
	30-38		39-90
9	14-15	0-38	
	14-39		39-90
10	5-16	0-75	
	5-18		76-90
11	24-25	0-39	
	24-41		40-90
12	12-19	0-42	
	12-13		43-90

R ENGINE NO. 2 THROTTLE CONTROL MOTION COMPENSATOR ASSEMBLY - REMOVAL AND INSTALLATION

1. Equipment and Materials

   Engine Power Control Rigging Kit, PN B996, or equivalent

   Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

2. Referenced Procedure

   71-12-00 Engine No. 2 Cowling

3. Removal/Installation

   A. Removal

      (1) Check that power control levers and reverse thrust levers, zone 210, are in idle position. Tag the power control levers and reverse thrust levers.

      (2) In the forward electronic service center, zone 112, insert a rig pin (Ref. Fig. 401) in the autothrottle clutch assembly.

      (3) Open LH Cowl, zone 433, (Ref. 71-12-00). Insert rig pin (Ref. Fig. 402) in engine input control box assembly.

      (4) Disconnect both engine (throttle) interface linkage rods (Ref. Fig. 402) at the motion compensator assembly.

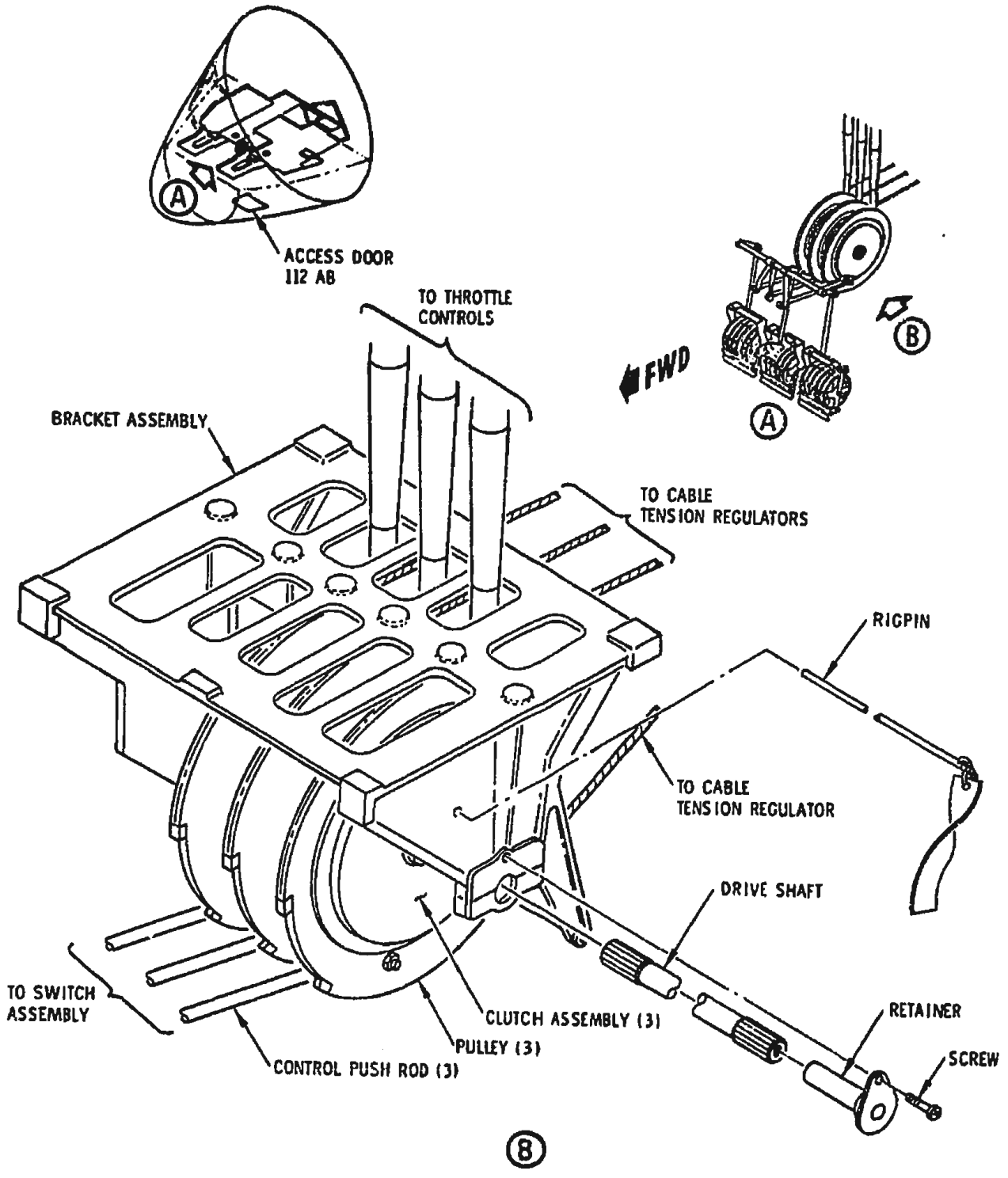
      (5) Disconnect torque shaft rod at the motion compensator assembly.

      (6) Disconnect both center engine side motion compensator strut assemblies at main shaft.

      (7) Disconnect center engine motion compensator center strut assembly at main shaft.

      (8) Support motion compensator, and loosen nut securing lockpin.

      NOTE: Do not remove nut completely to avoid lockpin falling into main shaft assembly.



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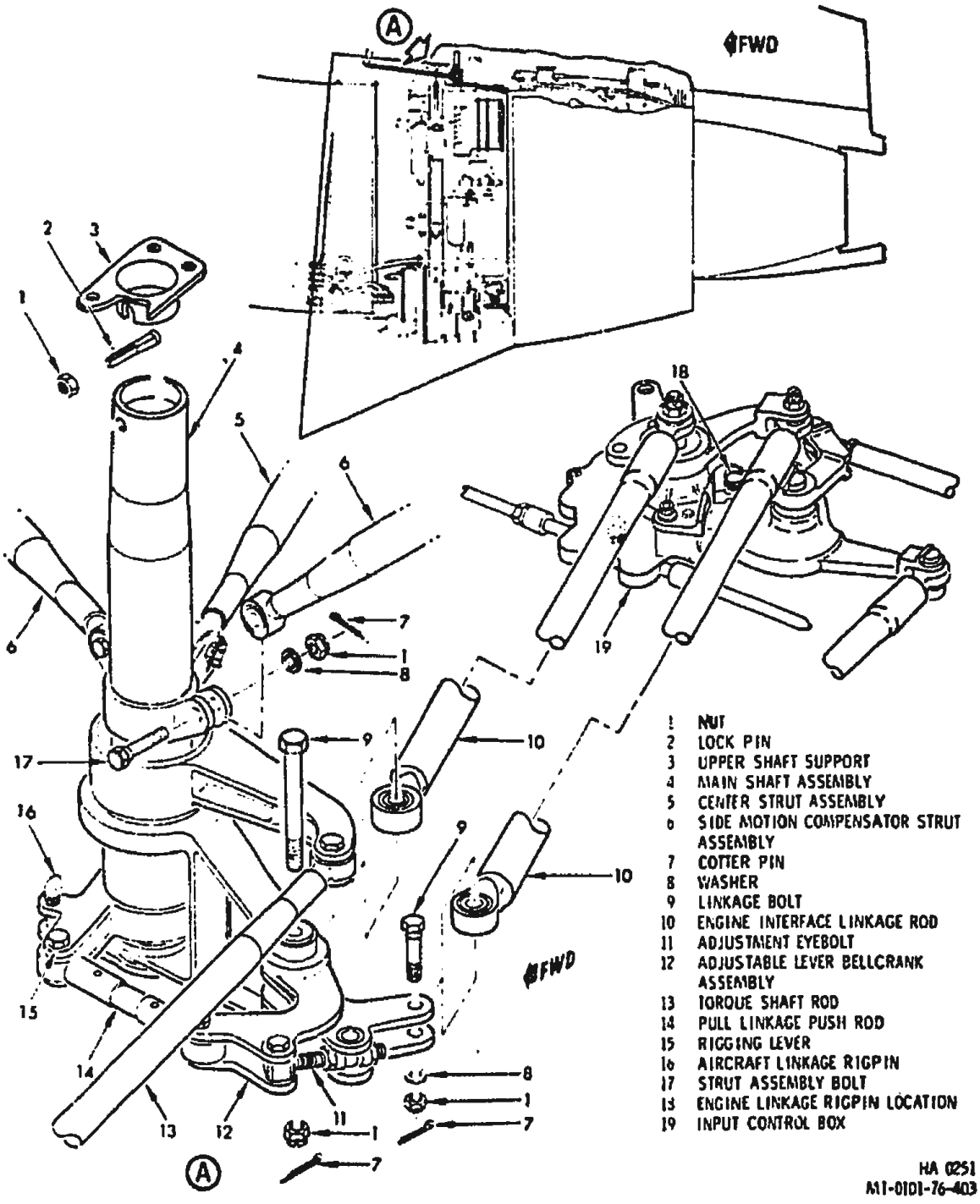
R Autothrottle Clutch Assembly Rig Pin
R Figure 401



Throttle Control Motion Compensator - Removal and Installation
Figure 402

EFFECTIVITY: ALL

(9) Remove motion compensator.

(10) Remove nut and lockpin, and retain for reuse.

B. Installation

(1) Insert lockpin from inside of motion compensator through hole at top and thread nut loosely onto lockpin

(2) Raise motion compensator assembly onto support with lockpin through slot on support. Secure with lockpin.

(3) Connect center engine motion compensator center strut assembly to main shaft.

(4) Connect both center engine side motion compensator strut assemblies to main shaft.

(5) Connect the torque shaft rod to motion compensator.

(6) Connect the inboard engine (throttle) interface linkage rod to the motion compensator.

(7) Connect the outboard engine (throttle) linkage rod to the adjustable lever bellcrank assembly.

NOTE: If the engine interface linkage rod does not fit, an adjustment to the adjustable bellcrank must be performed.

(8) Adjust the adjustable bellcrank as follows:

R R R NOTE: Total allowable vertical movement of bellcrank in relation to housing is 0.020 inches MIN to 0.337 inches MAX (.05cm MIN to .84cm MAX).

(a) Install a rig pin in the rigging lever and ensure that the rig pin is installed in the input control box assembly.

(b) Rotate the nuts on adjustable eyebolt to move the adjustable lever bellcrank in the correct direction to accept the outboard engine interface linkage rod.

(c) Secure the adjustable eyebolt nuts and lock-wire.

(d) Remove rig pins from the rigging lever and the input control box assembly.

(9) Close and secure LH Cowl.

(10) Remove rig pin from autothrottle clutch assembly in forward electronic service center.

(11) Remove tags from power control levers and reverse thrust levers. Secure with lockpin nut.

R WING ENGINE TORQUE SHAFT ASSEMBLY - REMOVAL AND INSTALLATION

1. Equipment and Materials

Engine Power Control Rigging Kit, PN B996, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

2. Referenced Procedure

71-11-00 Engines No. 1 and No. 3 Cowling

3. Removal/Installation

NOTE: The procedures are identical for left and right pylon-mounted torque shaft assemblies.

A. Removal

(1) Check that power control levers and reverse thrust levers, zone 210, are in idle position. Tag the power control levers and reverse thrust levers.

(2) In the forward electronic service center, zone 112, insert a rig pin (Ref. Fig. 401) in the autothrottle clutch assembly.

(3) Remove applicable pylon nose fairing forward panel, zone 451 or 461.

(4) Open applicable engine LH or RH hinged cowl, zone 413 or 423, and 414 or 424 (Ref. 71-11-00). Insert rig pin (Ref. Fig. 402) in input control box assembly.

(5) Disconnect both engine (throttle) interface linkage rods (Ref. Fig. 402) at the torque shaft assembly.

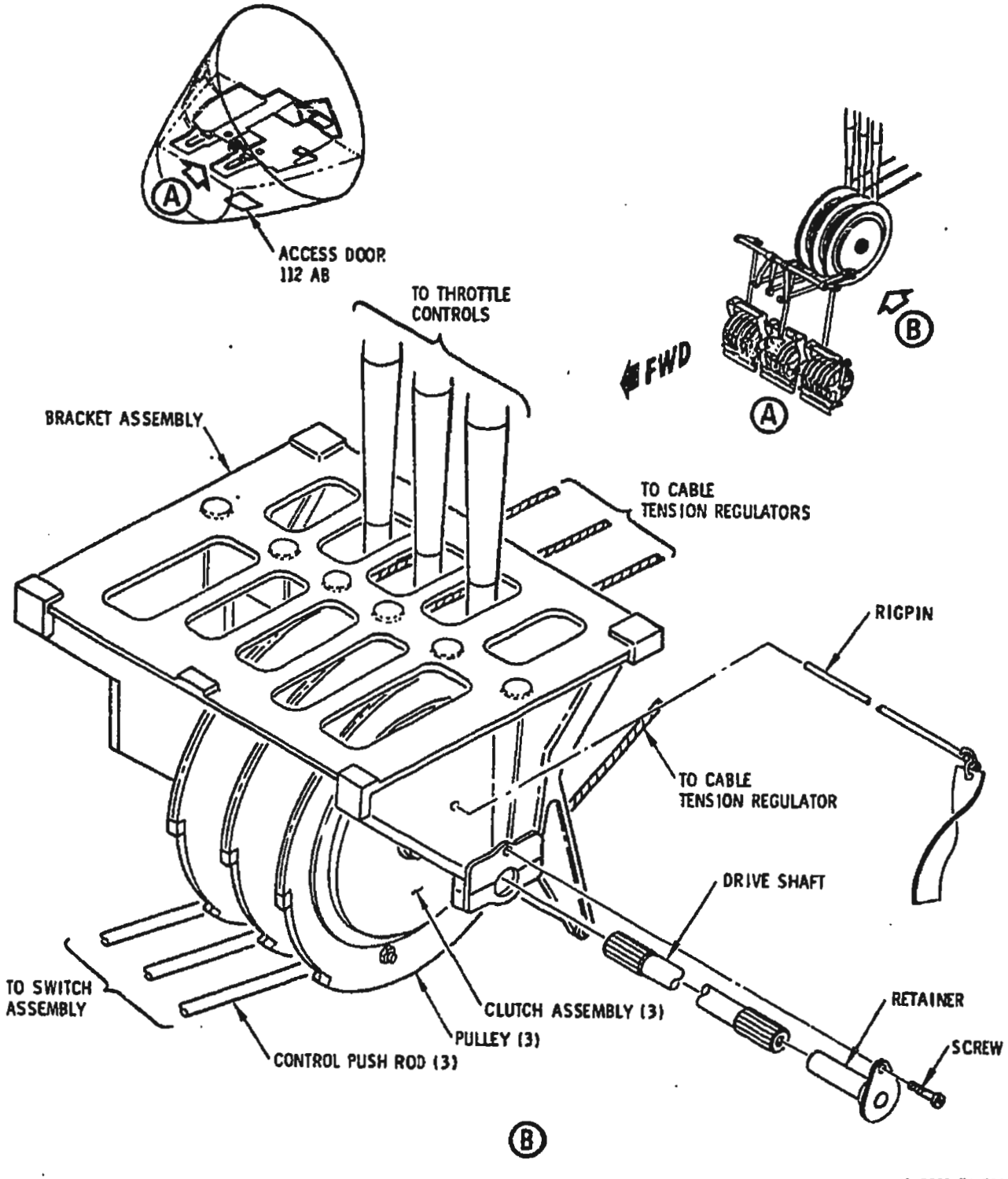
(6) Disconnect main shaft upper lever from top of torque shaft assembly.

(7) Remove torque shaft assembly housing nut from support.

(8) Lower torque shaft assembly and remove from pylon.

B. Installation

(1) Insert torque shaft assembly from bottom of wing pylon firewall, with index lug facing forward.



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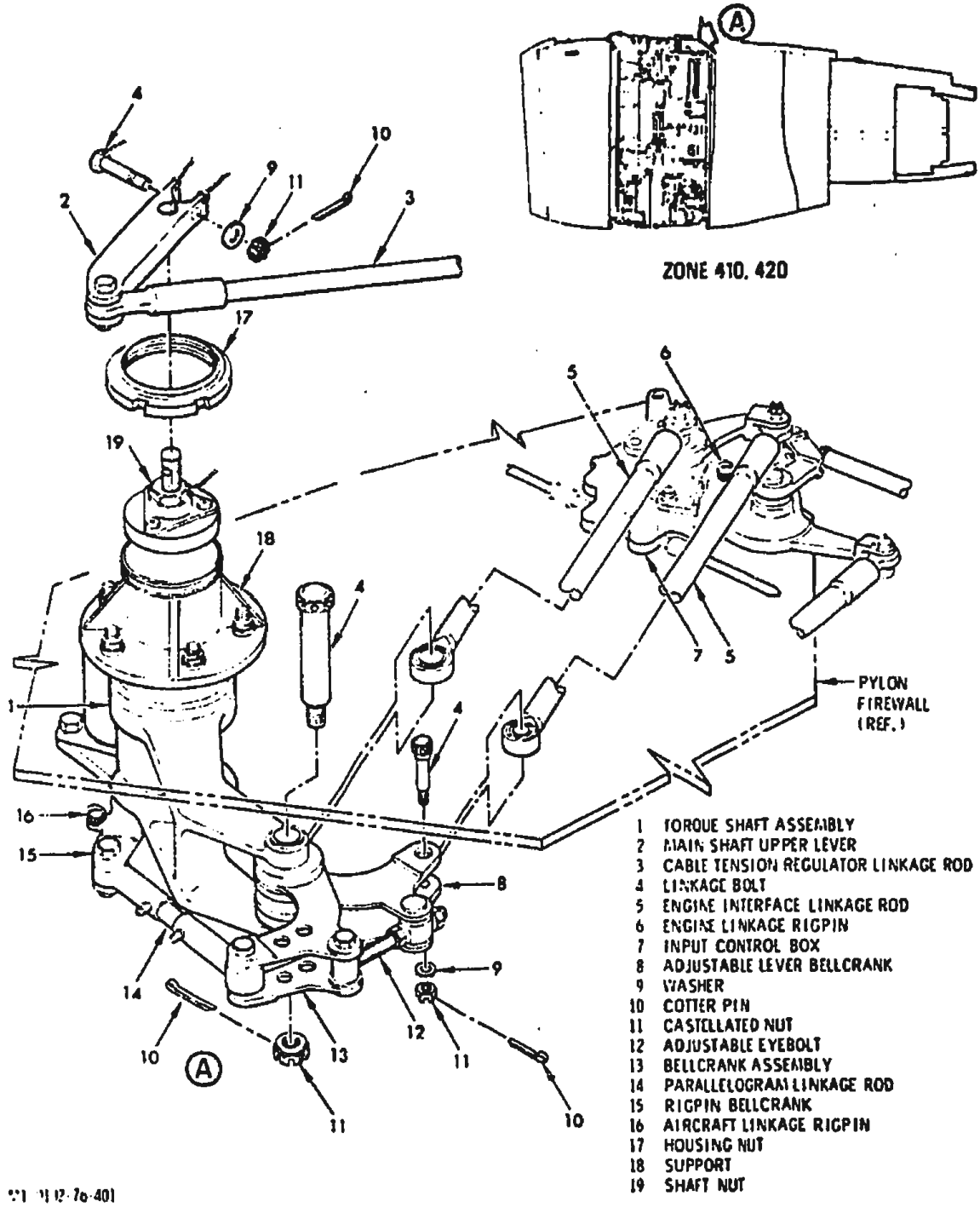
R Autothrottle Clutch Assembly Rig Pin
R Figure 401

EFFECTIVITY: ALL

001B



Torque Shaft Assembly - Removal and Installation
Figure 402

EFFECTIVITY: ALL

0016

(2) Seat the torque shaft assembly flush against the support.

(3) Slip housing nut over torque shaft assembly. Tighten nut with a spanner wrench. Lock-wire nut to support (2 places, minimum).

(4) Place main shaft upper lever on top of splined shaft. Align main shaft upper lever bolt hole with spline shaft notch.

(5) Insert bolt, either direction, through main shaft upper lever along spline shaft notch.

(6) Install washer and castellated nut on bolt; secure with new cotter pin (Ref. Fig. 402).

(7) Lock-wire bolt head to main shaft upper lever and lock-wire main shaft upper lever to shaft nut.

(8) Connect the engine interface linkage rods to the torque shaft assembly.

NOTE: If an engine interface linkage rod does not fit, an adjustment to the adjustable bellcrank must be performed.

(9) Adjust the adjustable bellcrank as follows:

R NOTE: Total allowable vertical movement of bellcrank
R in relation to housing is 0.040 inches MIN to
R 0.212 inches MAX (.10cm MIN to .53cm MAX).

(a) Install a rig pin in the bellcrank and a rig pin in the input control box assembly.

(b) Remove lock-wire from nuts on adjustable eyebolt.

(c) Rotate the nuts to move the adjustable lever bellcrank in the correct direction to accept the outboard engine interface linkage rod.

(d) Secure the adjustable eyebolt nuts and lock-wire.

(e) Remove rig pins (Ref. Fig. 402) from torque shaft assembly and input control box assembly.

(10) Close and secure engine hinged cowl.

(11) Install and secure pylon nose fairing forward panel.

(12) Remove rig pin (Ref. Fig. 401) from autothrottle clutch assembly in forward electronic service center.

(13) Remove tags from power control levers and reverse thrust levers.

ENGINE/APU EMERGENCY SHUTDOWN SYSTEM - ADJUSTMENT AND TEST

1. Equipment and Materials

Voltohmeter (Multimeter), Simpson Model 260, or equivalent.

2. Referenced Procedure

24-41-00 External Power/Ground Power Service System - Maintenance Practices

3. Adjustment/Test

A. Conditions required prior to test:

(1) Aircraft electrical buses energized from external power (Ref. 24-41-00).

R (2) On aircraft 001-018 without SB28-019,
R engine and APU fuel tank valves (ENG 2 TANK and APU
R TANK VALVE) open.

R (2) On aircraft 001-018 with SB28-019 and 019-999,
R engine fuel tank valve (ENG 2 TANK VALVE) open.

(3) Hydraulic supply shutoff valves (SUCT. S/O) open.

(4) Engine bleed air isolation valves (ENG. ISLN. VALVE) open.

(5) APU compartment ventilation valve (VENT CLOSED) open.

(6) Engine not running.

(7) Engine/APU emergency shutoff handles in stowed position.

(8) Circuit breakers on pilots overhead panel (CB1) closed as follows:

MASTER ALARM PWR ENG 1 (J1), 2 (J2), 3 (J3), and MASTER ALARM PWR WHL WELL APU (J4) and TEST (J5)

FIREBELL PWR (J6)

APU FIRE SHUTDOWN (two places) (J7) and (C18)

APU SEC EMER SHUTOFF (J8)

LOOP A ALARM ENG 1 (K1), 2 (K2), 3 (K3)

LOOP A ALARM APU (K4)

LOOP B ALARM ENG, 1 (K5), 2 (K6), 3 (K7)

LOOP B ALARM APU (K8)

APU FIRE DETECTION MASTER ALARM PWR (D18)

APU FIRE DETECTION ALARM LOOP A (D16), B (D17)

ANN RESET (L9)

(9) Circuit breakers on Flight Engineer/Second Officers vertical circuit breaker panel (CB3) closed as follows:

WHEEL WELL FIRE DETECTOR LOOP A (S1)

WHEEL WELL FIRE DETECTOR LOOP B (S2)

FIRE HORN (S6)

R CAUTION: THE FOLLOWING CIRCUIT BREAKERS MUST BE OPEN TO PREVENT INADVERTENT DISCHARGE OF THE FIRE EXTINGUISHER CONTAINERS.

(10) Circuit breaker on pilots overhead panel (CB1) open as follows:

ENG 1 - MAIN (C10)

ENG 1 - ALTN (C11)

ENG 2 - MAIN (C12)

ENG 2 - ALTN (C13)

ENG 3 - MAIN (C14)

ENG 3 - ALTN (C15)

APU - MAIN (C16)

APU - ALTN (C17)

B. Engine Shutdown System Test

(1) On the FIRE DETECTION LOOP TEST panel, energize the fire warning for only the engine to be checked by setting the loop selector for that engine to A or B. Set other loop selectors to other loop (not BOTH).

Press and hold loop TEST switch selected. Master FIRE lights on glareshield panel will illuminate. Fire bell must sound.

(2) Pull the engine emergency shutoff (fire) handle.

(3) Verify that fire bell is silenced.

(4) Verify that glareshield red master FIRE lights go out.

(5) Release loop TEST switch.

R (6) On aircraft 001-018 without SB28-019,
R note indicator lights as fire handle is pulled.

R (a) Amber emergency fuel shutoff light(s) (EMERGENCY
R SHUTOFF) come on momentarily then go out as valve
R closes.

R (b) Engine bleed air isolation valve (ENG ISLN VALVE)
R white flowbar light goes out.

R (c) Engine bleed air isolation vlave (ENG ISLN VALVE)
R white OFF light comes on.

R (d) Engine fuel tank valve (ENG. TANK VALVE) blue
R disagreement light comes on momentarily and goes
R out as valve closes. May not apply to No. 2
R engine.

R (e) Engine fuel tank valve (ENG. TANK VALVE) white
R flowbar light extinguishes. May not apply to No.
R 2 engine.

R (6) On aircraft 001-018 with SB28-019 and 019-999,
R note indicator lights as fire handle is pulled.

(a) Amber emergency fuel shutoff light(s) (EMERGENCY SHUTOFF) come on momentarily then go out as valve closes.

(b) Engine bleed air isolation valve (ENG ISLN VALVE) white flowbar light goes out.

(c) Engine bleed air isolation valve (ENG ISLN VALVE) white OFF light comes on.

(7) Remove engine emergency shutoff control panel from pilots overhead panel. Disconnect plugs from receptacles on rear of panel. Visually check panel control (switch) assembly. Control assemblies equipped with plastic cases should have metal brace assembly

securely installed. Verify continuity exists between pairs of receptacle contacts listed on Table 501 when the handle is in the extended position.

Engine Panel Receptacle Continuity Check
Table 501

NO. 1 ENGINE PANEL RECEPTACLE 9811-J640 CONTACTS		NO. 2 ENGINE PANEL RECEPTACLE 9811-J641 CONTACTS		No. 3 ENGINE PANEL RECEPTACLE 9811-J642 CONTACTS	
3,	15	3,	15	3,	15
4,	16	4,	16	4,	16
5,	18	17,	31	5,	18
5,	26	17,	2	5,	26
8,	19	18,	27	8,	19
12,	21	18,	29	10,	22
11,	24	8,	19	11,	24
		21,	23		
		11,	24		
		12,	34		

(8) Verify firewall shutoff hydraulic supply valve is closed. Measure resistance between contact in plug that mates with shutoff panel and structure ground (Ref. Table 502). Resistance of circuit should be 675 (±67.5) ohms when valve is closed.

R
R

Resistance Check
Table 502

AIRCRAFT WIRING PLUG	PLUG CONTACT CONNECTED TO VALVE CLOSE CIRCUIT	PLUG CONTACT CONNECTED TO STRUCTURE GROUND
No. 1 Engine Plug 9811-P640	Hydraulic System A 26	27
No. 2 Engine Plug 9811-P641	Hydraulic System B 31	20

Resistance Check (Cont)
Table 502

AIRCRAFT WIRING PLUG	PLUG CONTACT CONNECTED TO VALVE CLOSE CIRCUIT	PLUG CONTACT CONNECTED TO STRUCTURE GROUND
No. 2 Engine Plug 9811-P641	Hydraulic System C 29	20
No. 3 Engine Plug 9811-P642	Hydraulic System D 26	27
No. 1 Engine Plug 9811-P640	Engine Cooling Air 8	27
No. 2 Engine Plug 9811-P641	Engine Cooling Air 8	20
No. 3 Engine Plug 9811-P642	Engine Cooling Air 8	27

(9) Verify engine cooling air inlet shut-off valve is closed. Measure resistance between contact in plug that mates with shut-off panel receptacle and structure ground (Ref. Table 502). Resistance of circuit should be 17 ± 5 ohms when valve is closed.

(10) Verify generator field relay control circuit is continuous. Connect plugs to receptacles on rear of emergency shutoff control panel. Install panel in flight station pilots overhead panel. The shutoff (fire) handle remains in the actuated (extended) position. Gain access to generator control unit in the MESC. Remove generator control unit. Continuity should exist between contacts 9 and 32 of generator control unit receptacle. Install generator control unit.

(11) Push engine shutoff (fire) handle into stowed position.

C. Flight Station APU Shutdown System Test

(1) Place APU MASTER POWER switch ON.

(2) On the FIRE DETECTION LOOP TEST panel, set the APU loop selector switch to A or B. Set the other loop selectors to the other loop (not both). Press and hold loop TEST switch selected. Master FIRE lights on

glareshield panel will illuminate. Fire bell and APU fire horn must sound.

(3) Pull APU EMERGENCY SHUTOFF (fire) handle.

(4) Verify that fire bell and APU fire horn silenced.

(5) Verify that glareshield red master FIRE lights go out.

(6) Release loop TEST switch.

R (7) On aircraft 001-018 without SB28-019,
R note indicator lights as fire handle is pulled.

R (a) APU amber emergency fuel shutoff lights (EMERGENCY
R SHUTOFF PRI and SEC) come on momentarily then go
R out as valves close.

R (b) APU amber vent valve light (VENT CLOSED) comes on.
R (c) APU fuel tank valve (APU TANK VALVE) blue
R disagreement light comes on momentarily and goes
R out as valve closes.

R (d) APU fuel tank valve (APU TANK VALVE) white flowbar
R light goes out.

R (7) On aircraft 001-018 with SB28-019 and 019-999,
R note indicator lights as fire handle is pulled.

(a) APU amber emergency fuel shutoff lights (EMERGENCY SHUTOFF PRI and SEC) come on momentarily then go out as valves close.

(b) APU amber vent valve light (VENT CLOSED) comes on.

(8) Remove APU emergency shutoff control panel from the Flight Engineer/Second Officers upper panel. Disconnect plugs from receptacles on rear of panel. Visually check panel control (switch) assembly. Control assemblies equipped with plastic cases should have metal brace assembly securely installed. Verify continuity exists between pairs of receptacle contacts listed below when the handle is in the extended position.

APU Panel Receptacle Continuity Check
Table 503

APU PANEL RECEPTACLE 9811-J643 CONTACTS	
4,	17
7,	28
9,	22
11,	24
13,	26

(9) Verify APU generator field relay control circuit is continuous. Connect plugs to receptacles on rear of emergency shutoff control panel. Install panel in flight station Flight Engineer/Second Officers upper panel. The shutoff (fire) handle remains in the actuated (extended) position. Gain access to the generator control unit in the MESC. Remove generator control unit. Continuity should exist between contacts 9 and 32 of generator control unit receptacle 2424-J1B. Install generator control unit.

(10) Push APU shutoff (fire) handle into stowed position.

(11) Place APU MASTER POWER switch OFF.

D. APU External Control Panel Shut-Down System Test

(1) Place flight station APU MASTER POWER switch ON.

(2) On the flight station FIRE DETECTION LOOP TEST panel, set the APU loop selector switch to A or B. Set the other loop selectors to the other loop (not both). Press and hold loop TEST switch selected. Master FIRE lights on glareshield panel must come on. Fire bell and APU fire horn must sound.

(3) Pull the APU external control panel emergency shufoff (fire) handle down.

(4) Verify that APU fire horn is silenced.

(5) Release loop TEST switch.

(6) Verify that flight station glareshield red master FIRE lights go out and firebell is silenced.

(7) On aircraft 001-018 without SB28-019, note indicator lights as fire handle is pulled.

(a) APU amber emergency fuel shutoff lights (EMERGENCY SHUTOFF PRI) come on momentarily, then go out as valves close.

(b) APU amber vent valve light (VENT CLOSED) comes on.
(c) APU fuel tank valve (APU TANK VALVE) blue disagreement light comes on momentarily and goes out as valve closes.

(d) APU fuel tank valve (APU TANK VALVE) white flowbar light goes out.

(7) On aircraft 001-018 with SB28-019 and 019-999, note indicator lights as fire handle is pulled.

(a) APU amber emergency fuel shutoff lights (EMERGENCY SHUTOFF PRI) come on momentarily, then go out as valves close.

(b) APU amber vent valve light (VENT CLOSED) comes on.

(8) Verify APU generator field relay control circuit is continuous. Leave shutoff (fire handle) in the down (actuated) position. Gain access to the generator control unit in the MESC. Remove generator control unit. Continuity should exist between contacts 9 and 32 of generator control unit receptacle 2421-J1B. Install generator control unit.

(9) Return APU shutoff (fire) handle to normal (unactuated) position.

(10) Place flight station APU MASTER POWER switch OFF.

R (11) Close circuit breakers opened in Steps 3A(8), (9) and
R (10).

(12) Turn off electrical power (24-41-00).